city as organism

new visions for urban life

22nd **ISUF** International Conference | 22-26 september 2015 Rome Italy

edited by
Giuseppe Strappa
Anna Rita Donatella Amato
Antonio Camporeale

2

Urban Form Reading and Design
Urban Morphology Theories and Methods
New Researchers' Forum
Local Networks Forum

U+D edition

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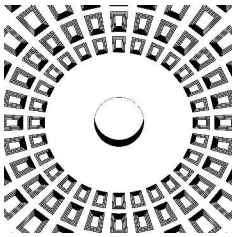

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Chair_François Dufaux
École d'architecture, Université Laval, Québec, Canada
Co-Chair_Susanna Clemente
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Knots

New Trends in Urban Design

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Urban Growth

Knottings

Marco Falsetti
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy
Keywords: Knottings, squares, urban fabric, processuality, typology

Abstract

The term knotting indicates the outcome of the constructive act of connecting together the different elements of a structure, in order to form a spatial knot within the architectural or urban organism, often covering a space, so as to connect the surrounding structures, usually consisting of a series of rooms or buildings[1]. Starting from this definition, the aim of this paper is to study this morphological type at the urban scale, by analyzing its origins, development and diffusion. As happened in many cases of the past, born from the dialectic between the fence and the cover, the serial and the organic structures, between the city and the building, knots form a sort of "urban palaces", intended as an organic complex of many elements, originally autonomous. Starting from the French bastides, and continuing with the genesis of the Spanish Plazas Mayores we will search for the process at the base of a type that, once formally settled, has been coded and widely used until the modern era, as it will be shown in the analysis of some cases belonging to different geographical and cultural contexts, like the Don Bosco district in Rome, the Barrio Civico in Santiago, Chile, the district of the port in Le Havre and the MDM (Marszalkowska Housing District) in Warsaw. The methodology employed for this research is based on the so-called "processo formativo" of the architectural organism considered at the scale of the urban fabric (Muratori, Caniggia, Strappa).

1 http://www.wikitecnica.com/annodamento/ - Giuseppe Strappa

The term knotting indicates the architectural outcome of connecting together the different elements of a structure, in order to form a spatial knot within the architectural, or urban, organism. The knotting summarizes the arrangement of the 'building matter' around a center, following which, a knot -at the same time spatial, constructive and distributive- is originated. An example can be observed into the processes that preside over the formation of the Roman palace and their subsequent developments, as well as in the modern postal buildings, also generated through a knotting of paths, overturned around a central space.

The knotting, which metaphorically refers to knots, is the outcome of a process that can be appreciated and defined only once it is concluded; the same dynamics presides over the formation of some specialized buildings, for which we can recognize a pre-formative phase (which contains the conditions for the final definition), some transitional phases of the new organism, and the codified type.

However the complexity of knottings is increased by the different scales involved, since the strong interdependence that exists between buildings and paths. Probably is the scale of paths that defines the hierarchy of knottings within the urban fabric, allowing us to identify the processes that affect the building scale (that results in a building), the urban scale (that is the scale of a block or of a system of blocks), and the territorial scale in which, the dimension of both buildings and paths, has a supra-urban importance.

The notion of knotting, which has been studied in a pioneering way by Gianfranco Caniggia, was then analyzed by Giuseppe Strappa, who has studied the potentiality of knotting as a methodology and as a design tool.

If knottings really exist, or not, is a matter that concerns mostly the architectural and urban critical interpretation and, in this sense, this study should be considered as belonging to that genre.

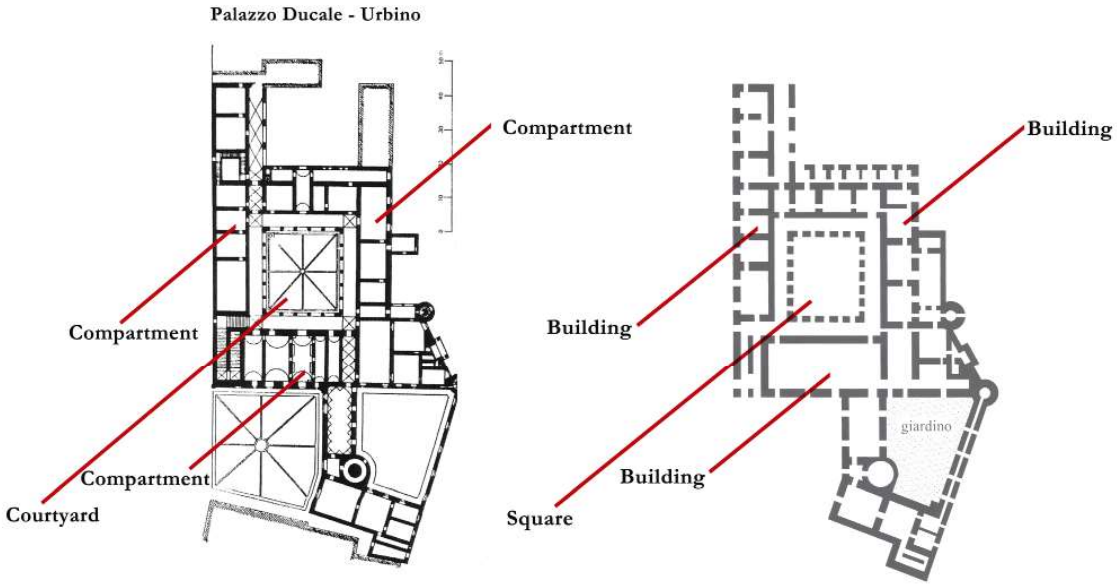
In this sense the knotting exists until we are able to understand its meanings within the city, in the same way the navigator reads in distant constellations figures who he already knows (the Zodiac, the Great Bear, the Virgo, etc), and he uses these similarities to give an understandable meaning to those aspects, vice versa merely phenomenal, that he uses to determine the route of his ship. With the same spirit then we researched the knottings within the dynamics of the city, by expanding the concept of architectural knot to the urban and the territorial scale: what we deduced was very useful for a critical interpretation of the central areas of several European cities but, mostly, it proved to be a fertile tool for design.

To facilitate the homogeneity of the dissertation, the argument has been divided into three different parts related to the scale of reference, therefore the criterion that has been followed to approach the study of knottings is mostly dimensional. This choice comes from the observation that the knotting constitutes an organic, aggregative typology, participating in the different scales of anthropic organization, or more precisely, that it exhibits several degrees of complexity depending on the level of specialization that it has and the type of 'influence' that it exerts over the urban fabric.

The relationship between knotting and urban fabric is complex as cause and effect of the structure of the latter. If we consider the knotting as a "specialization" respectively of the building, of the fabric and of the territory, we can then apply to it the statement about the dialectic between special buildings and urban fabric made by Gianfranco Caniggia: 'the location of the special buildings in the fabric is both cause and effect of the structuring of the same, and it changes in time and space, with the processuality of the fabric they belong'.

An objective difficulty that this subject poses is due to the fact that, since it is a processual organism, or better, since the knotting is the outcome of a process, it is possible to analyze it only before the specialization and the formation of the knot, or in the phase subsequent to its transformation. On the contrary it is almost impossible to analyze the knotting in a transitional phase, in other words during its formative process, similarly to

Figure 1. The "Town in the form of a palace"



what happened for the palace. For this reason it is perhaps helpful the study of a phase that could be defined as prototypical or pre-typical, in which namely, there are already many features useful to identify the organism in formation, but not enough to consider it as a knotting. In this case the story of fortified French medieval towns known as bastides represented an element of incredible interest, which, thanks to the planned urban grid (fairly similar from one city to another) allowed us to appreciate the different degrees of completeness in the formation of knottings.

The term knotting indicates the outcome of the architectural gesture of join together elements originally unconnected, on the basis of the correlation between paths and urban fabric as also happens for those special types of buildings (palaces, convents) originated through a reuse of already existing buildings (arranged along the internal paths encircling open spaces). The formation of a new organism from already existing parts, similarly to what we mentioned about the palazzo, is the result of the reorganization of a series of elements around a central space and, in the building scale, normally is expressed through the roofing of the nodal compartment. The biggest problem is therefore to identify the higher degrees of knotting and to recognize their characteristics within the processes of specialization of the urban fabric.

A first subdivision, useful to define the extremes of the argument, is to classify it according to the scale, or rather depending on a purely dimensional evaluation of the phenomenon, by dividing it into three scales: the building scale, the urban scale and the territorial scale.

As for the different scales involved in the phenomenon, it is correct to say that for the building scale the outcome of the knotting is summarized through the transition from the courtyard to the nodal space, and it represents a process in which the mutation of the open space generates entirely new buildings, having a higher degree of organicity. We will analyze in a second time the degrees of organicity because they represent the level of specialization of the organism and its higher or lower complexity. The scale of the block affects an intermediate dimension between the building and the territory, which results, in most cases, in the fact that territorial paths (dimensionally bigger and hierarchically higher than the urban scale) are not involved into the knotting. The extent of the urban fabric and of the paths involved is therefore approximately limited to the size of one or two blocks.

Figure 2. A Parisian passage

The most interesting example, well documented in literature, is probably represented by the Parisian passages, but also relevant are the Italian gallerias, the Japanese shotengai and the German hofes and, of course, all those other types of passages spread across the old continent, from Bavaria to Crimea. In the most cases the urban knotting is the outcome of a new correlation between urban paths and inner courtyards of the buildings, but it can be also considered as a further developement of the Hellenistic agorà, or of the Persian bazar.

Since originated from a processual matrix, then crystallized in terms of type, it is possible to define knottings all the derived 'planned' typologies. There are therefore cases in which a knotting has been planned, a fact that although easily ascertainable for the building scale, it is more rarely found in the territorial one.

In this case of course, if we consider the extent of the affected areas, we can note how the phenomenon occurred with a higher incidence in those geographical areas subject to a central planning, and where the resistence to International Style was stronger.

This explains why it is possible to find the principal cases of modern territorial knottings in Italy, France, Portugal, Chile, Poland and Soviet Union, all countries where construction occurred in continuity with the traditional dynamics of the urban fabric. It could be said, in some ways, that, the period in which this phenomenon was most widely diffused -the decade between the Fourties and the Fifties- was not casual, but that it corresponded to the acute phase of the conflict between the modern International Style matrix and the so-called 'Other Modernity.

Figure 3. The morphology of the French bastides and its relationship with proto-knottings

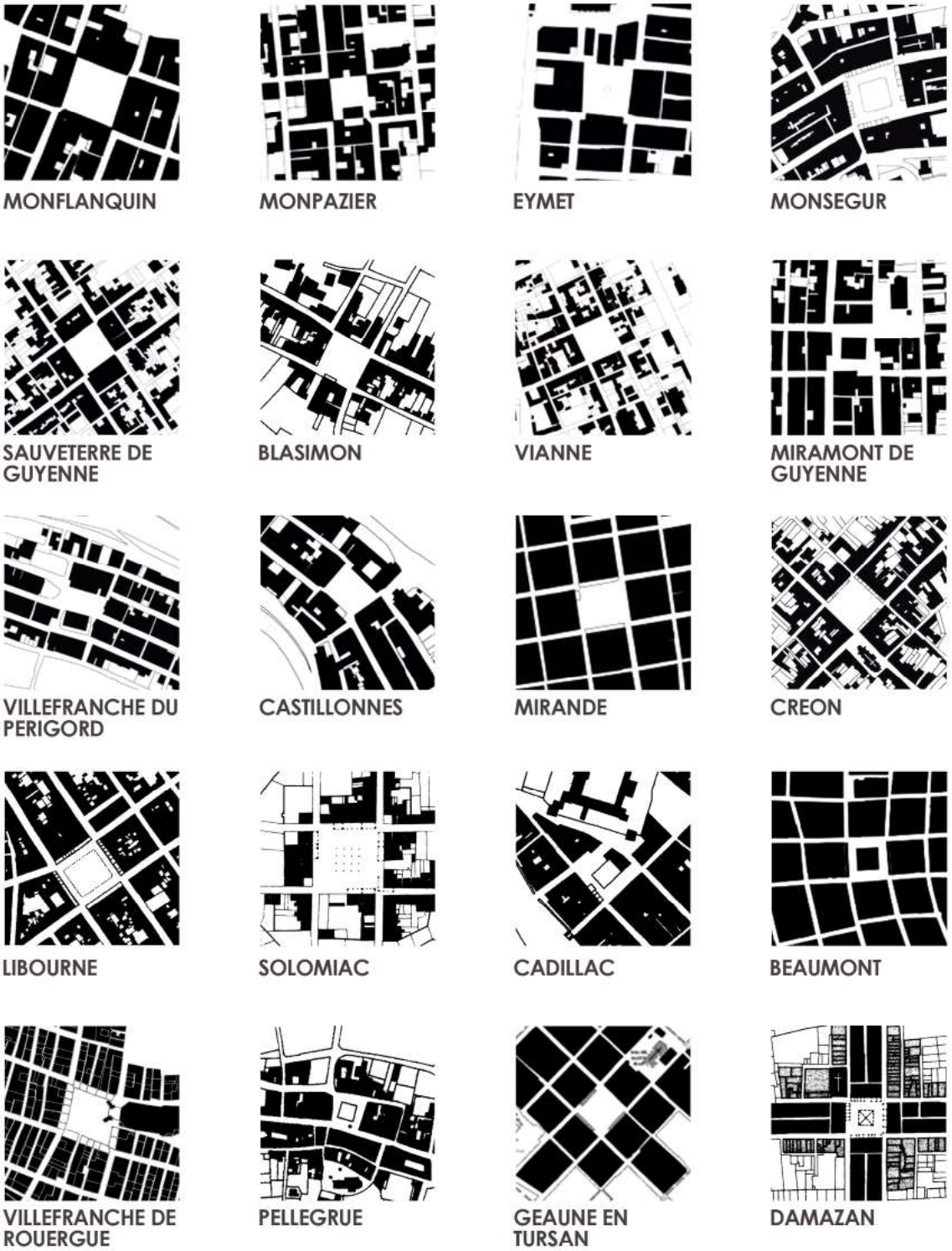
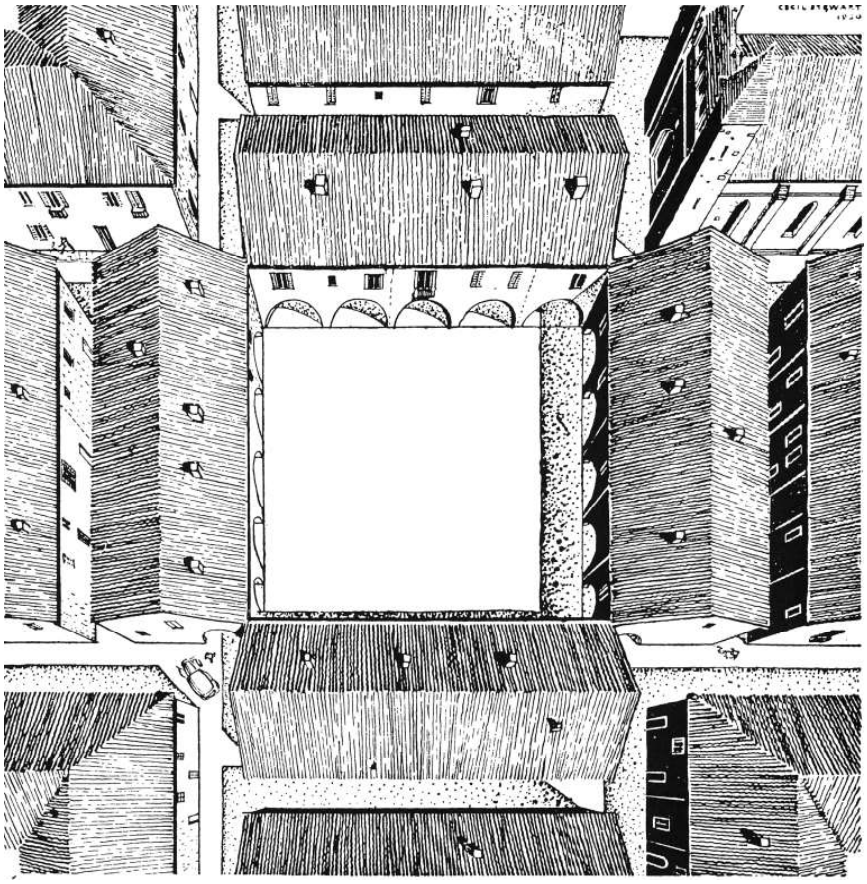


Figure 4. A territorial knotting in the central square of a bastide



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However, it is possible to notice how, even out of the period of maximum diffusion, there have been many cases of planned knottings even by contemporary architects, that although often limited to the urban scale, have interpreted the process in a modern way. A recent example is the project for the Funf Hofe in München by Herzog and De Meuron, that performs a process / project of knotting between the different buildings of a block, and simultaneously reinterpret the theme of 'passages'.

Finally, the territorial knotting -highest level of specialization of the fabric- implies the formation of an organism which configurates a significant portion of territory; in the most ancient cases such as the proto-knottings, especially those within an unplanned fabric, it affects the city in all its extension, in further cases, or in the modern ones, the extension is limited to a urban district or a quarter.

The territorial knotting, that represents the more complex type of organism as an expression of the highest level of specialization, does not have a linear development, but it can be organized in logical more than chronological phases; its uptake in the Mediterranean basin is intended, according to some studies, as a branch of the Roman forum or of some spatial typologies of the Hellenistic period, as the Syrian colonnaded avenues (Apamea, Damascus, Aleppo, Homs , Antioch).

If it is correct to say that the spread of territorial knotting is essentially limited to the Mediterranean area, that is probably because not only its origin but also its critical fortune are a manifestation of an organic idea of architecture. In this regard, it is useful to remember that the origin of the cross-shaped pattern that the city has, according to Plato, is to be found in the form of the single house. The fortune of this statement, that implies not only a mere formal parallel but the acknowledgement of those dynamics typical of the organism that rule both the elementary and the complex units, will associate many

great theorists and architects throughout history, including Palladio and Louis Kahn, who will therefore agree with these principles.

The ambiguous status of the territorial knotting, a middle way between building and fabric, implies a greater difficulty in recognizing those characters useful to identify it unequivocally, and yet exactly in this difficulty lies in some ways its nature. A fortunate statement made by Baldassarre Castiglione in its Cortegiano defines the Ducal Palace in Urbino as a 'town in the form of a palace'. In a later drawing that depicts the same palace, is shown a couple of identical plans: in one the various architectural elements (walls, rooms, courtyard) have their correct names in the other the same elements are considered as buildings, paths, square.

If we look at this second plan, by considering it in the terms of a diagram we have a measure of the most striking aspect of the urban knotting, namely to be an organism that has both the features of the building and the fabric, but also we can experience the difficulties to identify it clearly within the urban fabric.

This analogy has been observed by many ancient authors, like Leon Battista Alberti and Palladio, and is linked to a tradition that recalls the Roman authors; the interpretation of the town (or of a certain part of the town) as a huge palace is, in this sense, intended not to be limited to a mere analogy but is aimed to the awareness that different analogous organisms share the same dynamics whatever scale they have.

However the most difficult aspect lies perhaps in discerning which organisms, within the broader category of 'urban fences' can be classified as territorial knottings and which ones not; there is in fact a large series of squares, such as plazas mayores, places royales and, in general, all the squares having a uniform architecture, which reveal many features typical of the territorial knotting but that do not belong to this category.

One of the most easily identifiable examples is the Circus in Bath which, even if having rhythmic facades, does not have any relationship of interdependence with the paths, so it cannot be considered a knotting but a mere nodality.

The origins of this aggregative typology are uncertain but we can follow their processual evolution by analyzing the inner squares of the French bastides, that can be considered as proto-knottings since they share the same dynamics of the Italian palace, having a matrix route, implanting routes, and connecting routes and then a form of specialization. One of the things that distinguishes a knotting from the basic square is the fact that there is the specialization of one side (or of one of the buildings overlooking the square) or the specialization of corners, a fact that indicates the transition from square to organism.

In many cases it is possible to see how one of the sides, both if the fabric is planned or not, begins to be specialized, becoming a church, a market or a governative building and how there is the formation of arcades or passages through a knotting of paths. On the same time we can note how the involved paths are almost always territorial and, at the same time, how the territorial path is the one that becomes specialized.

In Chinchon, in Spain, it is possible to appreciate how the walkways start to form a unitary ensemble, acting as an organism. In the initial phases of the phenomenon those connecting elements were mostly made of wood and once it became categorized, they were made of stone or marble.

From the study of cases like Avila we can gather the relation between urban fabric and territorial paths, in detail a ridge path.

In Venice where a previous originally spontaneous path is overturned into the square with the formation of the arcades we have the creation of a huge uniform new organism.

At this point the main features of the territorial knotting, like the unity of the organism (where the organic unity is formed through a series of individual entities having the same architectural language), the interrelationship between urban fabric and paths, the specialization of a side of a square into a thematic building, and the verticalization of the paths (that represents the overturning of the paths) can be clearly identified.

Last but not least from the analysis of the evolution of the rhythmic façade, the most visible aspect of knottings, we can gather a further proof of how this phenomenon is not limited to a circumscribed era but it is part of a process that continued uninterrupted until the Modern era and, in some ways, is still ongoing.

References

Caniggia, G. (1984), *Lettura di una città: Como*, (Ed. Centro Studi di Storia Urbanistica).
Figueira de Faria (ed) (2008), *Praças Reais*, (Livros Horizonte, Lisbona).
García Rincón, W. (1998), *Plazas de España*, (Ed. Espasa Calpe S.A, Barcellona).
Krier, R. (1979), *Urban Space*, (Academy Editions, London).
Lemoine B. (1989), *Les passages couverts en France*, (Delegation a l'action artistique de la ville de Paris, Parigi).
Strappa, G. (2014), *L' architettura come processo*, (Franco Angeli, Milano).
Strappa, G. (1995), *Unità dell'organismo architettonico. Note sulla formazione e trasformazione dei caratteri degli edifici,* (Edizioni Dedalo, Bari).
Strappa, G. (1989), *Tradizione e innovazione nell'architettura di Roma capitale (1870-1930)*, (Kappa Edizioni, Roma).

Commemorating the Past and Constructing the Future: Checkpoint Charlie

Andreas Luescher
Department of Architecture and Environmental Design, Bowling Green State University, Bowling Green, OH/USA
Keywords: Berlin, Checkpoint Charlie, Critical Reconstruction, Urban tissue

Abstract

There is no more legendary border crossing in history than the physical vestiges of Checkpoint Charlie, the former border crossing from west to east Berlin, and its Soviet counterpart. Although the border installations have been removed in pieces to museums, stolen, or destroyed, the place remains a genius loci in the world imagination (Frank, 2009). At same time more venues are popping up where one can experience the Cold War era in a Disney-like environment based on urban forms of a free temporary open-air exhibit chronicling Cold War history, a private museum know as the Mauermuseum, a panorama of a divided Berlin and a memorial dedicated to Peter Fechter who was shot to death in a bold attempt to escape to the West. This paper examines how the urban fabric of the most well-known Cold War border crossing has become such decisive issue how to rebuild the urban tissue of a Baroque suburb. It discusses the Kleihues's (1986) and Stimman's (2005) philosophy of 'critical reconstruction'of modern Berlin and its application on a major redevelopment project 'Das Business Center at Checkpoint Charlie' (Loeb and Luescher, 2013). It analysis how Philip Johnson (1906-2005), one of the most influential American architect and colleagues applied the idea of morphologly rebuilding the 19th-century stone city (das steinere Berlin) as the basis for urban infill repair, and extension.

Introduction: The Scene

Checkpoint Charlie, a gateway as significant in its own grim, utilitarian way as the monumentally scaled ceremonial Brandenburg Tor, was the Allied checkpoint at the intersection of Friedrichstrasse and Zimmerstrasse. More than a symbolic point of physical passage from one side of the world to the other, the area around Checkpoint Charlie was and is a natural epicenter where memories of the last century's troubled periods still linger: the Weimar Republic, the Third Reich and the divided city. It is also a place where the crisis of modern architecture and urban planning coincide with the crisis of national identity. All authentic remnants of this most famous breach in the Berlin Wall have been lost, destroyed, or moved, and there is ongoing debate over the Checkpoint's importance as place of remembrance, as well as its future as the site of a Cold War museum (Fig. 1).

Because this portal between East and West represents a journey far greater than the short distance across the street, its systematic erasure provides an instructive summary of the conflicts of interest that have influenced urban form in Berlin during the past half century, particularly during the twenty years since reunification. Two proposed buildings that were to sit directly on the eastern and western thresholds of the wall at Checkpoint Charlie remain unbuilt, and their absence provides a second chance to rethink this historic intersection. At the moment, the unbuilt lots serve only temporary purposes. They passed through several stages to emerge as an open-air exhibit chronicling Cold War history, erected by the municipal government and as a panorama of divided Berlin by Berlin artist Yadegar Asisi, bombards visitors with imagery in a setting that has been emptied of all genuine historical references.

The U-bahn station at the intersection of Kochstrasse (now Rudi-Dutschke Strasse) and Friedrichstrasse bears the name of "Checkpoint Charlie," but visitors hoping to find anything of the Cold War's most famous intersection will be disappointed. Following the collapse of the Soviet Union and the unification of Germany, Checkpoint Charlie was dismantled and became part of Cold War history. Like much of the area where the Berlin Wall once stood, the property around Checkpoint Charlie was developed into a business center. Nothing authentic remains to remind passers-by of the area's turbulent

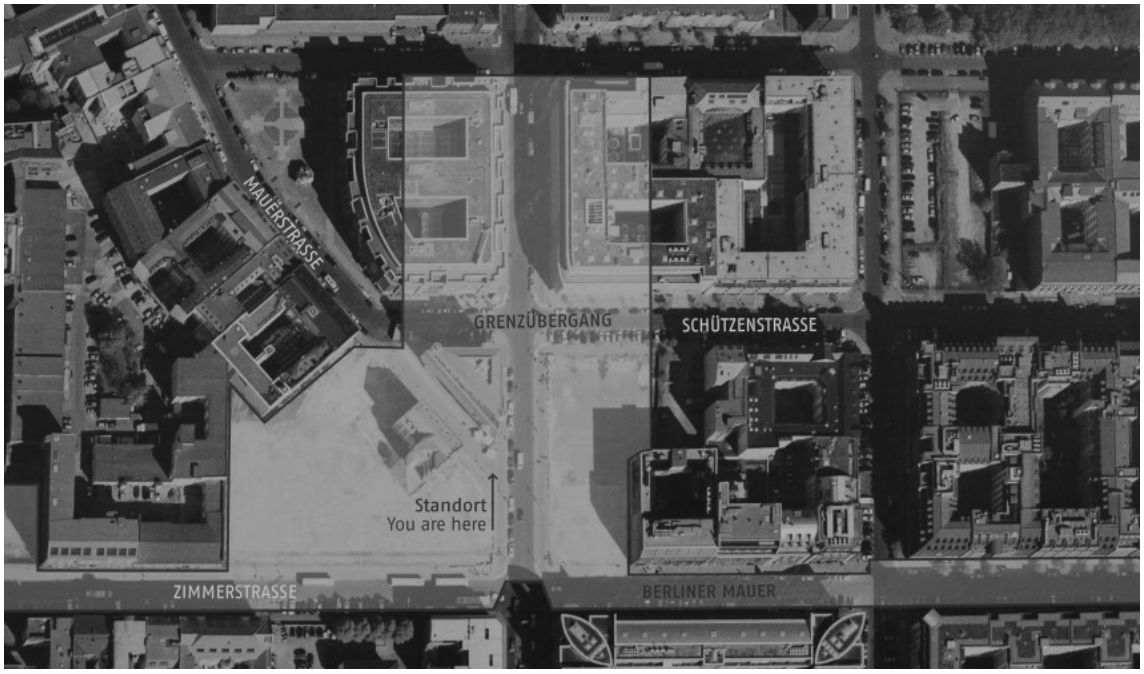


Figure 1. Aerial view of the former border crossing Friedrichstrasse/Zimmerstrasse, outlined and superimposed on the current streetscape, 2009 (Source: Author)

past. Instead, there is a jumble of ever-changing replicas, placards and memorials, some private, some city-sponsored. The bunkered checkpoint station booth and its famous sign ''You Are Now Leaving The American Sector!'' were moved to the Allied Museum in 1990, only to be replaced one year later in Disney-esque fashion by a replica guardhouse that seems slightly underwhelming and out of context. It is dwarfed by the portraits of a Russian soldier (not a Soviet) and an American soldier positioned back to back. The artist Peter Thiel was commissioned to produce the work as part of the Berlin Senate's "Art in Urban Space" program. The intensely controlled and watched intersection, where confrontations, demonstrations, escapes and presidential visits once took place, is gone, as is the huge, labyrinthine border installation on the East side of the wall, which once occupied an entire city block. The East German checkpoint watchtower, the last recognizable symbol of the Cold War, was demolished by the property owner, Checkpoint Charlie Service Company, at the end of 2000.

Four Generations of Border Installations

On 13 August 1961, the German Democratic Republic (GDR) sealed off the crossing points between East and West Berlin with primitive barriers of concrete block and barbed wire, which in time would be refined into an increasingly sophisticated Berlin Wall. Checkpoint Charlie began operations 10 days later on 23 August.

Before GDR authorities sealed off the city, the Eastern and Western Sectors had been freely passable over some 80 streets connecting the two parts of Berlin, with only sporadic police patrols. After 13 August, the number of crossing points was reduced first to 13 and then to 7. On 22 August, the East German government announced that foreigners—including Allied personnel—could cross only at GÜSt (Grenzübergangsstelle or Border Crossing Point) Friedrich-/Zimmerstrasse. The East German authorities called this crossing point a "necessary breach in their anti-fascist protection wall." It was the gateway for most Western visitors to the Eastern side of the wall, and Friedrichstraße was the first street they experienced in the capital of the German Democratic Republic.

In response to the East German move, United States Military Police set up checkpoint operations in a trailer parked in the middle of Friedrichstraße, opposite Friedrichstrasse 207 where U.S. authorities requisitioned space to house their guards. During the International Building Exhibition (IBA) from 1984-87, the Office for Metropolitan Architecture (OMA) was commissioned to rebuild Friedrichstrasse 207 into an apartment building that upgraded military facilities at street level for checkpoint operations. When the Wall fell, its lower part was reconfigured for commercial use; in the summer of 2010, the opening of a McDonald's restaurant significantly altered its appearance. OMA's introduction of color, varieties of shapes, and projecting and receding spaces added flair to Checkpoint Charlie's backdrop that was in marked contrast to the drabness and empty reaches of space on the other side of the Wall.

U.S. authorities also requisitioned space in the corner building at Zimmerstrasse 19a, which was then known as Café Adler (now Einstein Kaffee). This Federal-style building at Zimmerstrasse, with its handsome neo-classical orders, was first an Apotheke (pharmacy), then became a restaurant, and since the end of WWII has been a café. Spies hung out there during the Cold War. It was the only building to survive the Allied bombing intact, and for 40 years its corner orientation made it an especially good place to watch what was happening on the eastern side of the Wall's most famous portal.

These facilities made a symbolic statement of Allied determination to maintain rights of access to the Soviet Union sector and provided a single processing point for Allied travelers. In those days, the single processing point was important in order for the Military Police to ensure that travelers entering East Berlin made it out safely. This work was initially carried out by U.S. personnel, since Checkpoint Charlie is in the American sector. In 1962, the Americans were joined by British and French detachments to emphasize Allied political unity and to standardize operations. The checkpoint, which had long maintained secure access between the Western and Soviet sectors, was removed from Berlin's Friedrichstraße in an Allied ceremony July 22, 1990. For much of its existence,

Checkpoint Charlie served a dual function. It was, in the words of former British Foreign Minister Douglas Hurd, a "modest little hut," meant to control the flow of people between the two Berlins. But it was also a potent symbol of Cold War rivalries, and the potential for quick and widespread violence to break out. The tensions between East and West were exacerbated by a tank standoff at Checkpoint Charlie on 26-28 October, 1961 over Allied civilian access rights. On 17 August 1962, the attempted escape of Peter Fechter in the vicinity of the Checkpoint ended tragically when GDR border troops let bleed him to death from gunshot wounds on the East Berlin side of the Wall. His death ignited massive demonstrations. In 1973, the Checkpoint was struck by gunfire from East German troops hindering an escape. In January 1974, an escapee was shot just before the Checkpoint. On 9 and 10 November 1989, the Checkpoint witnessed a happier scene, as the opening of the GDR borders brought throngs of celebrating West Berliners to the Checkpoint to welcome East Berliners coming through for the first time in 28 years.

The checkpoint was curiously asymmetrical. During its 28 years active life, the infrastructure on the Eastern side was expanded to include not only the wall, watchtower and zigzag barriers, but a multi-lane shed where cars and their occupants were checked (Fig. 2). However, the American authorities, perhaps not wanting to concede that the division of Germany might be anything other than a temporary aberration, never erected any permanent buildings and instead made do with the iconic wooden shed.

The Competition as Methodology

Das Business Center at Checkpoint Charlie was going to be big by any urban standards—a million (1,248,350) square feet of "architectural transformation," as promotions billed it, on five acres around the epicenter of the city's destruction and division. The site ran along Friedrichstrasse and was shaped by both the curving Mauerstrasse, a remnant of the city's pre-Baroque wall that demarcates the project's eastern edge, and Zimmerstrasse, the line of the former Wall. Unlike public land projects, this one was not subject to the scrutiny of public planning debates. Such debates are heavily attended by Berliners, who, as essayist Jane Kramer points out, have become "amateur semioticians" out of concern that buildings will signal the restoration of the wrong kind of German power (Kramer, 1999, p. 54). Instead, the developer, the Central European Development Corporation (CEDC, 1993), held its own design competition. The design competition is a favorite device of the Berlin government, which promotes it as an effective instrument for achieving excellence in design.

In Fall of 1992, CEDC invited sixteen architectural firms (four American and twelve German offices) to submit design proposals for three of the four blocks known as Quartiers. The exception was Quartier 106 (now known as the Philip Johnson Building or Friedrichstrasse 200); the task of designing it was given directly to Philip Johnson by his friend Ronald Lauder, the American corporation's principal. The invited architects were given open and simple guidelines: first floor retail, second floor offices, and everything must be kept at 22 meters (72 feet) Traufhöhe (cornice line), 30 meters (98 feet) Gesamthöhe (building top), with evenness and solidity of block. Due to these requirements, the buildings are rapidly losing their characteristic differences and becoming more alike. There is, however, one exception: the developer has neatly addressed the government stipulation that each development must contain at least 20% residential space by cramming all of its required dwellings into Block 201 b (now Charlottenstrasse 75), which contains 180 apartments and 23 penthouse suites (Fig. 3). Single-purpose buildings are simply more profitable than mixed-use structures, which cost more to build and maintain.

Berlin is above all a city of rules, and the planning rules set out for the part of the city where Das Business Center site was located were elaborate. City leaders wanted the Friedrichstrasse to be as close as possible to the way it was before. The Friedrichstrasse was laid out in the eighteenth century. In those days, the buildings were all the same and particularly all the same height: only as high as a person could walk up by foot. Recreating the eighteenth century architecturally was the concept of Hans Stimmann, the director of Berlin's huge planning bureaucracy from 1991 to 2006. As Kramer notes, the "orders

Figure 2. Morphological analysis of border-crossing fortress from 1945 to 1980. The structures shaded in black represent the buildings remaining after the Allied bombings; those shaded in light gray represent variations of border arrangements. 2011 (Source: Author)

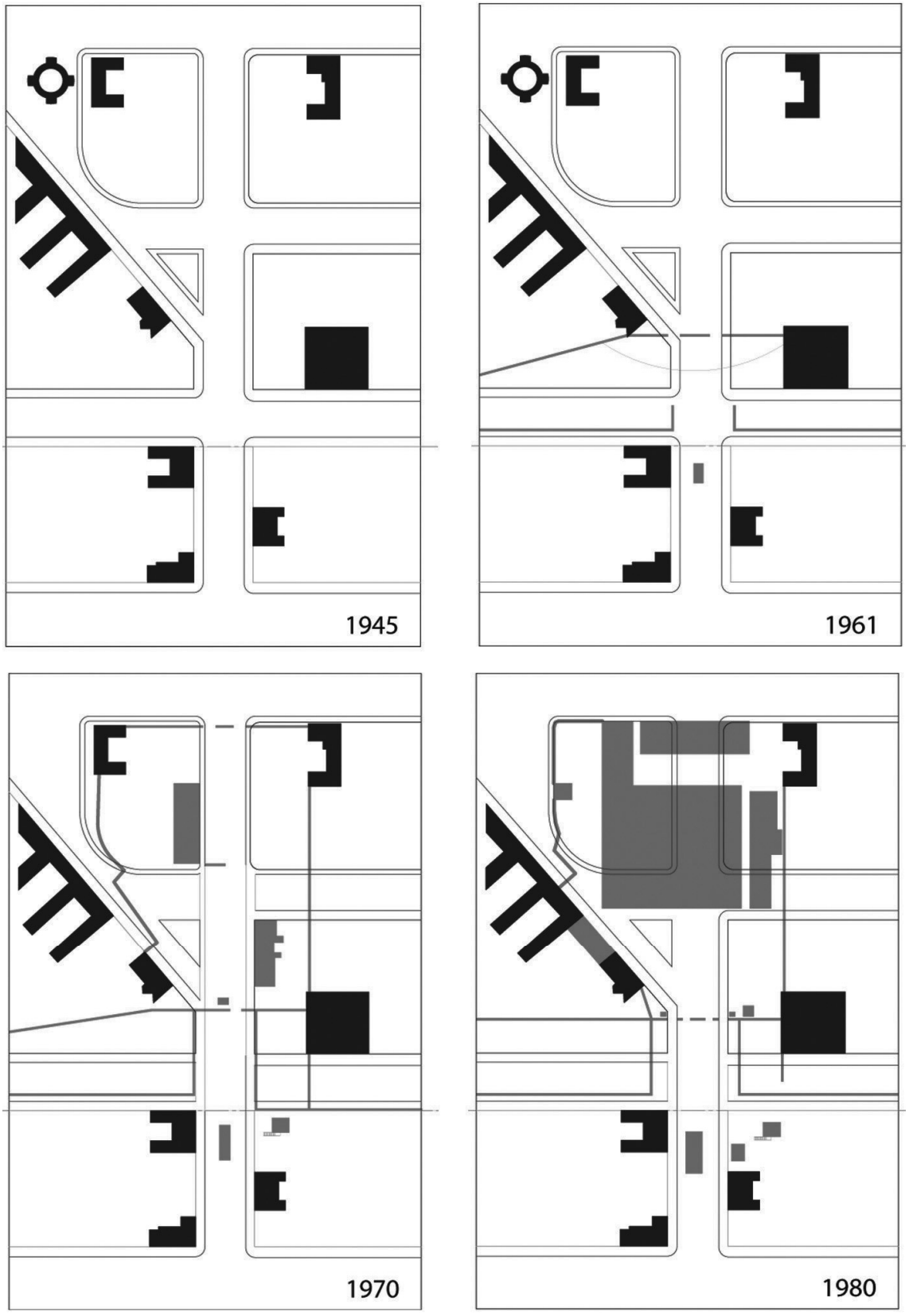
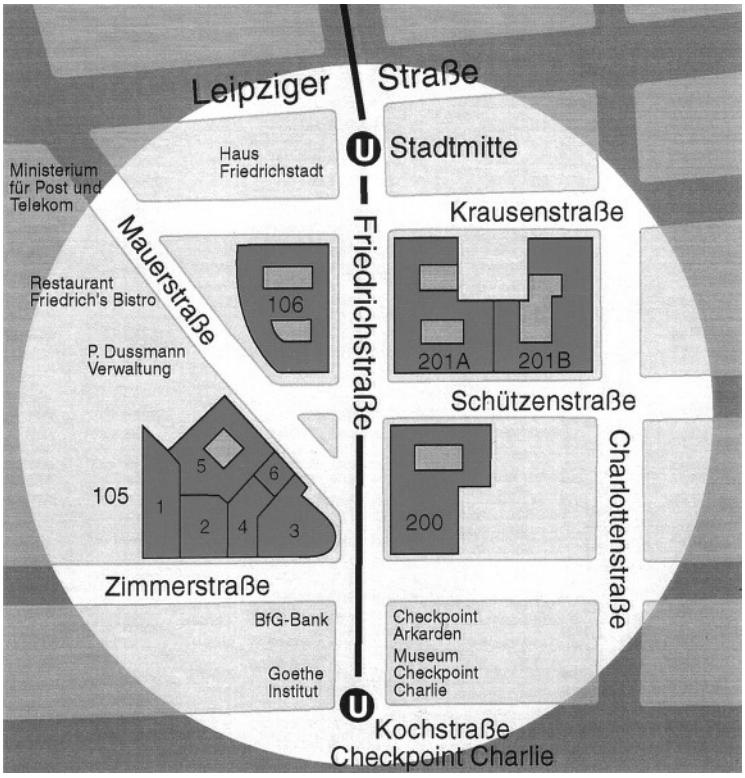


Figure 3. Proposed design schema for Block 106 by Philip Johnson of New York (built), Block 201a by Lauber and Wöhr of Munich (built), Block 201b by Glass and Bender of Berlin (built), Block 105 by SOM of New York (unbuilt) and Block 200 by Engel and Zimmermann Architects of Frankfurt (unbuilt), 1992 (Source: Author)



were to stay in line with the numbing criteria of Stimmann's Berlin concept— which was soon refined, with the help of a local 'philosopher of planning' named Dieter Hoffmann-Axhelm, as a blueprint for the 'critical reconstruction' of the city—and to accommodate to the size and density of the 'eighteenth-century block' and the 'integrity' of the stone facade. (Stimmann called this 'the stone Berlin,' although much of eighteenth-century Berlin was, in fact, brick, plastered over and painted in the Prussian ochre of the city's sandstone palaces …)" (Kramer, 1999, p. 55).

Philip Johnson, while chafing quite publicly under the restrictions, offered the following concession: "I deeply sympathize with Dr. Stimmann's problem of recreating an old section of the city. What do you do? We keep everything similar to the 18th century height. That was what's there. I think it's absolutely right, that cities should build what they want and should force the architects to build in that mode so as to give you a unity that you would not have the American system of everybody building everything just anyway they want". But he said on a different occasion, "It isn't architecture at all! It's like doing a crossword puzzle. The rules are all laid out" (Johnson, 1994, p. 82).

For the most part, the international architects complied with the restrictive specifications of Stimmann's Berlin concept, but it's safe to say that none of them were entirely happy about it. They agreed that the new structures should be informed by Berlin's architectural traditions, but they hoped to temper their interpretive references with something modern and forward-looking. Like any good architect, they thought that the proper Berlin tradition was the one that began now—but "they were told to reinvent a moment of history instead" (Kramer, 1999, p. 55).

The competition entries revealed two different attitudes toward block completion. The American architects' proposals acknowledged the site's dramatic history by creating an urban space through internal courtyards, passages, and a series of individual

components; the winning proposal even featured a conical tower. In contrast, the German architects' design interventions emphasized the return of an inner-city block to its pre-war structure through simple infill of the building gap. None of the German architects addressed the importance of redefining the block corners in their designs. Rather, their main focus was the giant, undefined opening for a memorial plaza. None of the design interpretations resembled the former labyrinthine East border guard station (Luescher, 2002). The competition's outcome reveals the inadequacy of interpreting a place with significant cultural memories primarily by adding new buildings to existing structures (Fig. 4). The restrictive principle of "building stone," which consists of a three-part façade with a base, a middle, and a set-back roof, didn't help either.

Lauber and Wöhr (now WWA) of Munich was selected to design Block 201a (now Friedrichstrasse 50); Glass and Bender of Berlin was selected to design Block 201b (now Checkpoint Plaza). Both teams produced well-designed and progressive but pragmatic and uncomplicated commercial buildings. They stand in contrast to Philip Johnson's massive structure, which lacks any specific character. Lauber and Wöhr's 8-storey office block design reflects the influence of their former mentor Richard Meier and their participation on the Siemens Headquarters Building, Munich (1983-1999). Lauber and Wöhr's design has similarities to Richard Meier's concept in the choice of white for skin that counteracts light and street of the location. Specifically, the corner of Fridrichstrasse and Krausenstrasse presents a closed, solid face, whereas the corner of Friedrichstrasse and Schüztenstrasse is fully glazed. In stark contrast, Bender and Glass's façade has the same double layering everywhere: an outer skin following the line of development along the street and a second skin, mostly of glass, at approximately 1.80 meters (5 feet) behind the first, extending to all floors.

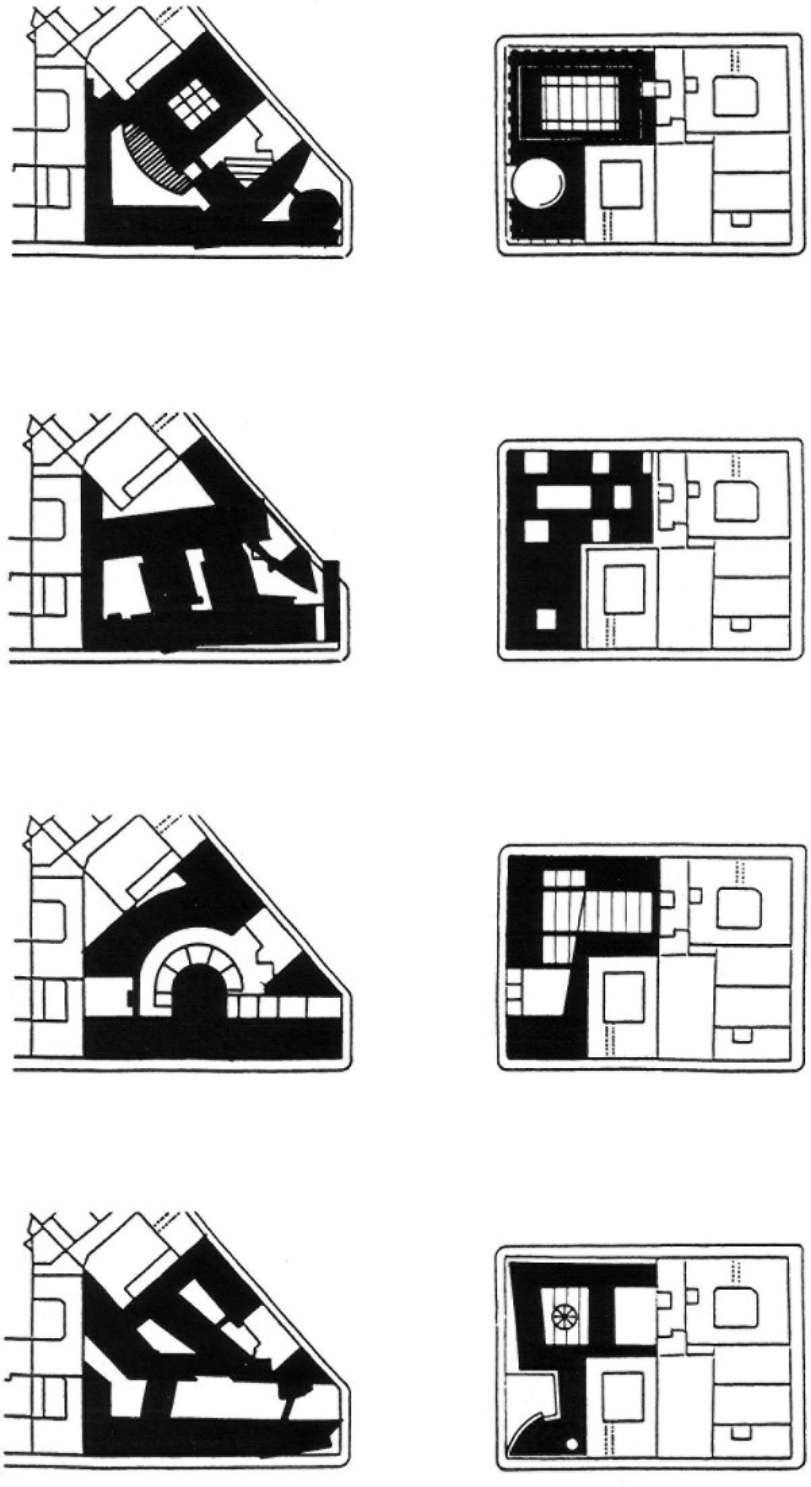
In the end, David Childs of SOM, New York won the competition for Block 105, and Jürgen Engel of Kraemer, Sieverts & Partner (now Engel and Zimmermann Architects), Frankfurt am Main, won the competition for Block 200. The two architects were asked to memorialize the crossing at Checkpoint Charlie in their building designs. Childs did so by incorporating the symbol of a raised gate into the facade of his building. Jürgen Engel wove a narrative by encircling the last standing GDR guard tower with a cylindrical void in the building façade. In Alan Balfour's words, "Though almost too active for its neighbors, it is a dynamic intersection of volumes and figures, a lively assertion of the ability of architecture to both represent and support complex weavings of events and structures. It is left to Childs to memorialize the crossing at Checkpoint Charlie with the symbol of a raised gate, strapped prow like to the façade of the building. This, like many of the American projects, is a virtuoso performance" (Balfour, 1995, p. 188).

The Bankruptcy

The building permits expired for the project, and the developer of Checkpoint Charlie, Kommanditgesellschaft (KG), declared insolvency in 2003. The blocks that were ultimately built seemed to turn against the original request: the recovery of the site's historical outline. The current design destroys the picture of the place and denies its presence in the world's collective memory. Even the former city building director Hans Stimmann commented, "The projects show shortcomings in their design in response to such a historically significant place" (Stimmann, 1994, p. 119). Hanns Adrian, a former city planner of Frankfurt am Main and Hannover, uses similar language: "The burying of this historic place is clearly troubling. It is similarly deplorable that one can hardly recognize Checkpoint Charlie today" (Adrian, 2001, p. 67).

Today, the overall impression one gets when visiting Checkpoint Charlie is one of great confusion. The space visually reflects the squabbles among many of Germany's current factions; in that sense, it continues in the great tradition of Checkpoint Charlie as a place of standoff. Berlin, a cash-strapped city still struggling with the financial costs of reunification, has taken a few steps toward meeting the growing demands of "Wall tourism." The former Senator for Cultural Affairs, Thomas Flierl, says that the Checkpoint Charlie site should be maintained by the public for the public and should present complex messages

Figure 4. Four American design solutions submitted for Block 105, Friedrichstrasse, left side. Winner: David Childs of SOM, New York; 2nd Prize: Thom Mayne of Morphosis, Los Angeles; 3rd Prize: Dirk Lohan (now Lohan Anderson), Chicago; 4th Prize: Wendy Evans Joseph of I. M. Pei, New York. Four German design solutions submitted for Block 200, Friedrichstrasse, right side. Winner: Jürgen Engel of Krämer, Sieverts and Partner (now Engel and Zimmermann Architects), Frankfurt am Main; 2nd Prize: Johann Eisele + Nicolas Fritz (now 54f Architekten), Darmstadt; 3rd Prize: Thomas Höger, Berlin; 4th Prize: Franz Jürgen Langer, Munich



consistent with the complexity of the issues surrounding the site. He promises that in the near future, Berlin authorities will establish a Cold War Museum there, as part of the overall commemoration plan (Flierl, 2006). The plan for it was not completed even by 2011, the 50th anniversary of the Wall's construction (indeed, it remains uncompleted to this day). The proposed museum remains controversial, underfunded and caught up in tensions within the German political hierarchy of municipal, regional and federal governments.

The lack of systematic analysis of cultural materials and their assessment for preservation created a vacuum that left the way open for private initiatives, such as the Mauermuseum Checkpoint Charlie, to claim and define historical spaces, often for commercial ends (Loeb and Luescher, 2013). Its "exhibits" have always carried a distinct message: the inevitable demise of the GDR, the victory of the West over the East, and the ultimate defeat of communism by the free world. The Mauermuseum has de facto control of the Checkpoint Charlie site, which features a replica of the iconic wooden hut, supplied by a local citizens' group. Another result was the fragmentation and dispersal of artifacts, evidenced by the piecemeal redistribution of Wall elements worldwide as well as the creation of distant interpretive sites, such as the Wende Museum in Los Angeles.

A Planning Opportunity Still Exists

Here at Checkpoint Charlie, the debate shifts from whether Berlin will ever become the service metropolis and east-west turntable of Europe to how to design and build a place of freedom and a place where world history is manifested. For the second time since unification, a new framework for the development of the site is possible—a framework that recognizes the site's value as a cultural and historical resource and celebrates its diversity. However, the new owner of the land, Bankgesellschaft (BAG) Hamm in North Rhine-Westphalia, has made no response to this extraordinary planning opportunity.

Architects, planners, developers and politicians might do well to study Karl Friedrich Schinkel, the great German architect whose environmental planning of central Berlin has been overlooked or, at best, underestimated. In 1815, Schinkel became the official architect charged by Friedrich Wilhelm II to embellish Berlin. He found the city devoid of a plan, a collection of disparate buildings and a tangle of canals and streets. Through a series of designs for churches, a city square, a civic theater and new museum, warehouses, and residential structures, Schinkel attempted to turn the center of Berlin into a series of vistas and perspectives that varied in scale and orientation. Schinkel realized that the architect's organization of the physical environment could not be restricted to a single building, street, or space. He was interested in amplifying dynamic rather than static space (Boyer, 1994). The problems facing a nineteenth-century planner, like those of the twenty-first-century planner, were neither explicitly articulated nor well defined. But where Schinkel sought to achieve environmental unity out of disparate components, the head of the Senate Department for Urban Development has pursued his conviction that the real Berlin was a cluster of small streets and low stone houses with matching windows—a kind of ur-European city where every building looked as much as possible like every other building. As Kramer writes, "[Stimmann] thought that anyone with a taste for height, glass, metal, or, for that matter, 'architecture' should be encouraged to move"(Kramer, 1999, p. 55).

The debate surrounding design restrictions focuses on how to maintain the integrity of the city. The problem, according to Philip Johnson, is that "Under that cloak, any clerk in any office can say, 'I prefer this corner to that corner.'" Cities like Berlin are trying codify into law the points that the American urbanist Jane Jacobs made, but for exactly the opposite reason, some years ago. Jacobs believed that a city grows organically but sometimes needs a personalized touch that must be applied only with great care. Berlin has every right to freeze Friedrichstrasse the way it is, but it is the variety in Friedrichstrasse that gives it its actual flavor. Nostalgia is one thing, but when you freeze the whimsical dictates of Senate Department for Urban Development, that's another thing altogether. Design guidelines per se are not the problem. Customary restrictions like coverage, height, windows, and density are reasonable and expected. But in Berlin, the city planners are

micro-managing and going too far into the details. They have intentionally—not merely inadvertently—become designers. The schemes presented to the Senate Department for Urban Development rely on the old structure of Berlin's city blocks despite the radical change in the city's newly designated uses and typology. Ironically, their density is incompatible with the traditional urban typology that inspired them. Architectural invention was not allowed the degree of freedom required to resolve the contradictions inherent in using traditional precedents for contemporary functions (Venturi, 1993).

Checkpoint Charlie remains a site of opposition. Stakeholders, politics, economics, and emotions continue to drive the dramatic, often contentious decision-making process that will determine the future image of the site. The arguments over how Berlin should preserve historic Wall sites are unlikely to disappear. It is not a question of whether the history manifested at Checkpoint Charlie will be remembered, but how it will be remembered. The process needs to go forward. Ideally, a plan would creatively address its mandate to preserve the footprints of those who have gone before, to recognize individual victims, and to provide access to bedrock. At the same time, it should seamlessly reconnect this site to the fabric of its current urban community. Perhaps Checkpoint Charlie can become a place where the past and present meet in a lively debate.

References

Adrian, H. (2001) "Konzepte für die Zukunft Berlins" in *Von der Architektur-zur Stadtdebatte*, Stimmann, H. (ed.) (Verlagshaus Braun, Berlin).

Balfour, A. (ed.) 1995. *World Cities: Berlin*. (Academy Editions, London)

Boyer, C. M. (1994) *The City of Collective Memory: Its Historical Imagery and Architectural Entertainments* (MIT Press, Cambridge, MA).

CEDC. (1993) 1st Checkpoint Charlie Colloquium. Berlin: Checkpoint Charlie Friedrichstrasse-Das Business Center.

Flierl, T. (2006) *Gesamtkonzept zur Erinnerung an die Berliner Mauer: Dokumentation, Information und Gedenken*. (Senatsverwaltung für Wissenschaft, Forschung und Kultur, Berlin).

Johnson, P. (1994) *Philip Johnson: the architect in his own words* (Rizzoli, New York).

Kramer, J. (1999) "Living with Berlin: Berliners have the chance to turn Europe's most notorious city into an ideal city-if they can only decide what that is" in *The New Yorker*, 50-64.

Loeb, C. and Luescher, A. (2013) "Cultural Memory after the fall of the Wall: The Case of Checkpoint Charlie" in *Building Walls and Dissolving Borders*, Stephenson, M. and Zanotti, L. (eds.) (Ashgate Publishing, London).

Luescher, A. (2002) "Refashioning No-Man's-Land: Urban Image Politics and the Visual Dimensions of Democracy" in *Cities*, 19, 155-60.

Stimmann, H. (1994) "Kritische Rekonstruktion und steinerne Architektur für die Friedrichstadt" in *Neue Berlinische Architektur: Eine Debatte*, Burg, A. (ed.) (Birkhauser Verlag, Basel).

Venturi, M. (1993) "Platz and Plans" in *Design Quarterly*, 32-36.

From node to network, Knotting process in the modern tradition of postal palaces

Susanna Clemente
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy
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Abstract

Postal palaces represented in the nineteenth and twentieth centuries the occasion of remodeling and developing the city from their nodal essence par excellence.

Communication has always played a key role in modern society and, before becoming areal network, it has been embodied by points, for centralities.

The study will build on the post offices made since the end of the nineteenth century, questioning the character of monumentality and / or public service given to them, studying the evolution of language in the tradition of Modern.

The competition of 1932 in Rome for the construction of four post offices constitutes a turning point in this regard. Examples distant from the rhetoric of regime, and academia, expressive vehicle of rationalism, engines of urban development according to the four cardinal points.

The process of specialization and knotting crosses both the scale of the building and the scale of the city and makes it possible to fit the ancient, producing subsequent developments.

The study also wants to question on current building code, on the appearance of today's network engaged from communication and its possible morphological evolution.

Introduction: The Scene

The postal palace type, become popular in the late nineteenth century and developed throughout the twentieth in Italy and in Europe, has an innate character of nodality, as a local and urban centrality at the same time, primarily dictated by the function performed. It was in fact a symbol and embodiment of the primary role played by communication in modern society; invested most of the time by a statal official character, it created what could be called a widespread monumentality.

The text examines three case studies that for different reasons represent a turning point in the formation of the type, read as a knotting process. The Fondaco dei Tedeschi, the Post Office in Via Pisacane in Parma and the one in Trieste are in fact a progression, from the reuse of an existing building to the design of a knotted space.

The Palace of Post and Telegraphs of Naples, major work by Giuseppe Vaccaro, then transfers the knotting on urban plan; it paves the way for the competition for the four post offices in Rome announced in 1932, the focal point of discussion. The winning projects realize in fact a point in the evolution of modern language next to the Italian tradition of construction, driving the growth of urban fabric in modern city, becoming part of the historical and/or consolidated ones.

Today we are witnessing a process of virtualization of communication and a consequent dematerialisation of information interchanges, the same buildings described so far do not seem emptied of their role of attractors, developing and directing urban growth. A careful analysis of the causes behind this success can drive even a morphological provision of the city of future, adjusted, built in fact by infrastructure: from node to network first, then from network to hub.

About postal palaces

The derivation of the term post from Latin *statio posita* sees the birth of postal services and their widespread dissemination under the Roman Empire. The *stationes* constituted a system of nodality as intersections of *cursus*, preferential paths for the information transfer. Tabula Peutingeriana describes the space, the territory, unrealistically, but as an ideogram, according to the distance between the exchanges, highlighting the central importance of the service and its extension, over 200,000 km. The concept of nodality as seen is inherent in the functional organization of space. We must make a leap of more than a thousand years to find, with the unification of the national states, a system that is equally advanced and widespread. Arriving to the contemporary age, we can see that the functional approach to design the type of building yet to be defined was still privileged. Architect Giuseppe Vaccaro drew up for the competition in 1932 the schemes of distribution patterns to guide designers, gathered the following year in the text published by Giuseppe Maylender *Schemi distributivi di architettura*. These represented a welcomed innovation in the context of rapidly changing technical and technological demands, in which we often had to deal with types of public and private buildings still never investigated. Vaccaro also had always fought for the creation of merit systems of access to the design, implementation and management of public works. His goal was to ensure a certain turnover in assignments. He underlined that to write a call and take part in committees that judge colleagues was a difficult task, equal to that of design, especially in absence of evaluation systems and defined rules. The novelty of the Roman competition therefore not only allowed freelancers to access the design and building of services, local and urban in this case, but also the realization of interpretations not purely academic or steeped of the official character of the fascist regime. Four symbols of modernity, drivers of urban development for each of the four cardinal points, formed in fact an opportunity to reshape the city.

Rome, as discussed further in the dedicated section, is a clear, paradigmatic exemplification of the possibility of the architectural node of the postal palace to become an urban node, determining the morphological configuration of entire sections of the city. Rome in 1932 was a cluster whose basic unit was one of the district, there were a variety

of focused and integrated features and services in them. The decentralization policy advocated by the regime had triggered first a spread of housing like wildfire in the area, emptying the center but at the same time requiring new office buildings that tried to meet the new demands. The urban centrality concept was already in germ. The postal palace was a means of excellence for the expression of the aforementioned centrality. It bound in fact two different realities: on the one hand local functions, thought for the neighborhood, on the other hand the representative ones, offices. The Roman village wanted to become the Great Rome of Municipalities.

Also no city like Rome was intended and still is as a testing place for the graft in the historic or consolidated fabric. The Italian Modern, pointed after the war because of its overly-contextualist or regionalist drifts, had to compare itself with formal and constructive traditions, with all their weight and difficulties of acceptance and integration of the new, but at the same time with its endless resources in *genera*. These organisms are generic in the etymological sense of the word, they generate families of multiple and new architectures, they refer to a few, universal notions since they did not transform according to a specific function and have maintained a strong tie with the fundamental principles of composition.

The following cases precisely clarify the references to this absolute character in a time of crisis and uncertainty of languages, rich in ever-changing technical, economic and social demands, and they put the palace at the origin of the formation process, as a singularity of urban fabric able to specialize from an original housing function.

The formation process of the postal palace

The Fondaco dei Tedeschi, whose origins trace back to the thirteenth century, was and still is one of the buildings of greater size in the city of Venice. In 1500 it was divided by two open courtyards, the main of which was on the transverse axis of the Canal Grande. It was destroyed by fire in 1505. The present structure, built on the previous, traces back, in its oldest parts, flooring and stone structures still preserved, to 1508. Sansovino took part in the new factory since 1534. The functions were manifold, such as residences, offices that today we would call customs and commercial deposits. After a long period of decline, the Napoleonic occupation and the Austrian, with the unfortunate renovation of 1839[1] it was transformed into a Post and Telegraphs Office. Two successive interventions, readable in some cases without interruption, the first concluded in 1908 and the second in 1939, have led to its present condition. This last conversion and at the same time restoration of 1939 is an expression of the knotting as a transformation and not as a mere condition. The installation of a skylight made of opaque glass to hide the iron structure transformed the central space of the courtyard in a distributively served space, as well as spatially prevalent and statically brought. In the rooms serially arranged along the sides of the former courtyard modern services, counter services for parcels, registered and insured mail were placed as well as writing rooms and rooms for the technological systems. These ex-served areas became distributively serving and statically cooperative. The introduction of a function, we use the term, unexpected for the palace was welcomed by critics of the subject and not, who recognized the former warehouse as the most elegant and the most practical of postal palaces in Italy[2]. Furthermore Donghi had already theorized in 1925 the role of the covering of the central space[3], become nodal for a new type of building, as one of the transformations of the knotting process. The change is not only formal and functional then, but structural (think of the complete replacement of wood with reinforced concrete for the supporting parts and with brick and concrete for the floors) and represents the essential character of the intervention, it can be read like a fundamental passage and bound to the definition of the formation process of the type in question.

[1]As defined by Forlati, see in this regard the publication (1940) 'Il Fondaco dei Tedeschi', *Palladio* 4
[2]As previous
[3]See in this regard Donghi, D. (1925) Manuale dell'architetto (UTET, Torino)

Figure 1. The Palace of Post and Telegraphs by Giuseppe Vaccaro in Naples, detail

The postal palace in Via Pisacane in Parma, on draft by Moderanno Chiavelli dating back to 1909, was built on the pre-existence too. Specifically, a state property was re-used, the so-called "di riserva". This had previously hosted in the knotted courtyards a court theater. This aspect represents a step forward in identifying the recurring characters in the evolution of the building type, as it may arise in direct relation and comparison with the specialization of other building types, such as theater (special similarities are also found in the contemporary achievements of buildings for stock exchanges). Postal palaces like theaters arise from the coverage and knotting of serial subordinated structures around a central space. This central space is just the open courtyard. But the transformation process of the postal building in general happened in a time incomparably faster, often taking shape as a solution of the pre-existence occupation. In theater changes occurred slowly, over several centuries, yet it is interesting to note a relationship even more immediate with the courtyard, because in palaces it hosted shows since the fifteenth century.

The third case study is represented by the Post and Finance Office of Trieste, completed in 1894 and designed by Austrian architect Friedrich Setz. First interventions in chronological order and instead logically last, it has a knotted space dedicated designed from scratch, a centralized hall for the public that connects two symmetrical portions of the building around two large open courtyards. The style of the building can be considered neo-Renaissance, immediately placeable in the current eclectic age of the late nineteenth century; but this figure, far from modernity, can not reduce the lead of innovation. It is a reference to *genera* the palace by Setz, that proposes a new critical response to the need for a multipurpose space for the reception and sorting of the public.

It is in this direction that the intervention by Vaccaro in Naples can be read. More than twenty years later its building phase, started in 1928, was completed in 1936. The architect turned out winner of a competition which marked the first entry of freelancers in statal reali-

Figure 2. From a nodal building to a nodal urban space: the postal palace by Giuseppe Vaccaro in Naples
Figure 3. The imperfect nodality: the postal palace by Giuseppe Samonà in Rome

zations, not without difficulties. The building changed its linguistic expression over the years, maintaining a monumental character of derivation also in its final modern aspect. The cloister of Sant'Anna dei Lombardi was for the architect the only existing structure to compare with because in 1926 the demolition program, planned for the area of the so-called Guantai Vecchi, had been applied by Giovannoni Commission. The work is part of the fifteenth century cloister, it reconstructs a portion of it, giving it the shape of a node, overcoming a considerable difference in height to bind together Via Cesare Battisti and Via Monteoliveto. The curved facade accentuates the dynamism of the link. These characteristics define the transition from the nodal building to the nodal urban space. The readability at the urban scale of the architectural work is produced thanks to a careful phenomenological research of insertion, of the graft of the object in the city. The design study is cleverly integrated into the morphological, structural one. The work by Giuseppe Vaccaro as a whole is unique since it is distributed over a period that demonstrates an absolute individuality and autonomy. The so-called acclimatization, which can be read clearly and logically in this as in every product, is for the designer not a rediscover after the war. He carries instead a *real continuity*. This definition consequently refers to the ability to fit with his own item in history becoming history.

The uniqueness of Vaccaro and his experience in Naples are real points of contact with the entry into modernity of the building type enshrined in the national competition for the construction of four post offices in Rome in 1932. Vaccaro had a role of fundamental importance in it, as previously mentioned. The paternity of the competition was ascribed to Mussolini himself and launched by the Minister of Communications Costanzo Ciano; it did not represent an occasional exception in the statal building activity but it marked a real change of direction in the dynamics of the design and construction of buildings for the public.

Figure 4. Urban knotting: the postal palace by Mario Ridolfi in Rome

The competition of 1932 in Rome

For these reasons each of the four winning projects marked a departure from the fascist rhetoric and a personal exit to rationalism.

The approach of Armando Titta office along Viale Mazzini does not differ at all from the distribution pattern provided by the announcement. The building seems rather an adaptation of this with the addition of the curved facade, far from the perfectly geared solution by Vaccaro and instead purely formal, to sweeten the intersection of the lot with the design of the road. The public hall is certainly a successful nodal space, however the excessive hierarchy of secondary spaces and services, felt like a real workshop, determines the perception for parts of the work. The emphasis of the entrance, with a marble lining which nevertheless does not correspond to a precise structure of reinforced concrete, is therefore not supported by the intrinsic characteristics and instead remains monumental.

The draft by Giuseppe Samonà for the post office in Via Taranto also presents itself as a synthesis between the parts, with a hierarchy of spaces which often corresponds to a differential treatment of facades. The building is on three sides to complete a lot defined "difficult"[4]. Two serial structures, two perpendicular arms intersect each other producing an angular hall (at the crossroads) but placed at a different height of roads and pedestrian routes. A soft staircase takes the visitor to the decentralized entrance, laterally placed. An imperfect nodality the one by the Sicilian architect in Rome, it produces an image of addition rather than integration. The only of the four postal palaces not in line with the radial system encoded in the formation process described until the last century and summarized by Vaccaro in his compositional schemes. The work is quite a logical connection with the serial and rationalist interpretation of the post office, while producing a very personal language, and perhaps far from modern.

[4]See in this regard Poretti, S. (1990) Progetti e costruzione dei palazzi delle Poste a Roma: 1933-1935 (Edilstampa, Roma)

The postal palace in Via Marmorata by Adalberto Libera marks the transition from the architectural scale to the urban nodality. The building consists of pure elements admirably synthesized with each other and yet with a strong formal, functional and structural autonomy: the entrance and hall for the public directly accessible from the street, the C-shaped body of the services and connections around the first place and finally the trilithic portico in connection with the front garden. In fact, the foregoing split configures a short cut or half-court whose the other half consists of the completion of urban square. This is externally formed by the urban knot of which the architectural node of the hall represents with its bribes paths a reversal. A substantial morphological novelty that apparently seems to work only to slightly modify the layout of the rooms given by the announcement. The use of materials from highly distinct colours, the polished Predazzo purple porphyry of the portico on one side, the white dusty Roman travertine on the other, enhances the feeling of pure forms, pulls them over in an almost metaphysical ambit. Particular emphasis is also due to the study of natural, diffused light that filters through a modern opaque glass dome that amplifies the perception of colours and space. Two souls coexist in the building, that of the town hall and that of the monumental machine. It critically reflects the plant of the palace, and of the machine the innovation and the dynamic relationship between the component elements.

Mario Ridolfi finally realizes in Piazza Bologna the culmination of the evolutionary process of the building type. As Libera does, he makes minor changes to the floor plan, proposing in fact a courtyard in the middle, but the logical and morphological reversal takes place at urban scale on a square part of a stellar system. Ridolfi generates a wonderful identification of the building with the urban nodality. The planimetric conformation seems to gather, connect and tie flows, routes, the main road layout, directing the development of the city. The building type is read as a special item and for this reason organizer of the urban fabric. The use of a reinforced concrete structure in false is close to the design of the facade covered with brick. The knowledge of a common technique allows the treatment of the curved line. The integration and the strong sense of identity which was mentioned before are certainly heightened by the use of local materials, typical of the Roman building tradition.

A decade after, the project of the postal palace by BBPR in Via Beethoven was completed in 1941. The proposed model is strictly serial, in open antithesis with the process shown so far. Even the rationalist language, clearly linked to the interpretation of European modernity, does not admit any insert and/or connection to the place. A position that we will slowly unravel in postwar Italy in favor of an interpretation of Modern in continuity with the pre-existence.

Conclusion

The results of the contest of 1932 have produced noticeable events until today, especially in functional and morphological aspects. The process of defining the identity given by urban centrality have further taken root thanks to the development of the surrounding tissue precisely triggered by postal buildings. Thanks to the role they have played in the subsequent transformation of the city, they have not lost their value. Their particular quality has been recognized and brought to shine again thanks to the recent restoration of Modern (see in particular the intervention by Sergio Poretti on the postal palace in Via Marmorata).

Today we are witnessing a progressive emptying of their function. Communication is gradually more and more intangible. Intersections, exchanges are no longer physical. The node intended as a point of connection is on the move and for this reason it is difficult to detect it spatially. We see a predominance of the course, of the communication path over the node. Our cities are governed and indeed completely based on infrastructures.

Yet the postal palace, which has been responsible for transferring the model of the palace in modernity, resists consolidated in tissue, becoming an example, nearly a genera, for the development of the urban centrality even if with distinct functions.

References

Dal Falco, F. (2002) *Stili del razionalismo: anatomia di quattordici opere di architettura* (Gangemi Editore, Roma)
Dazzi, M. (1941) *Il fondaco nostro dei Tedeschi* (Ministero delle Comunicazioni, Direzione Generale delle Poste e Telegrafi, Venezia)
Forlati, F. (1940) 'Il fondaco dei tedeschi', *Palladio* 4
Giordano, P. (1996) 'Il Palazzo delle poste e dei telegrafi di Giuseppe Vaccaro e Gino Franzi a Napoli', *Disegnare idee immagini* 13
Gravagnuolo, B. (1988) 'Giuseppe Vaccaro e Gino Franzi Il Palazzo delle Poste, Napoli, 1933-36', *Domus* 693
Minnucci, G. (1933) 'Il concorso nazionale per i palazzi postali di Roma', *Architettura* 10
Mulazzani, M. (2002) *Giuseppe Vaccaro* (Electa, Milano)
Poretti, S. (1990) *Progetti e costruzione dei palazzi delle Poste a Roma: 1933-1935* (Edilstampa, Roma)
Poretti, S. (2005) *Il restauro delle poste di Libera* (Gangemi Editore, Roma)
Strappa, G. (1995) *Unità dell'organismo architettonico* (edizioni Dedalo, Bari)
Strappa, G. (1996) *Palazzi Storici delle Poste Italiane* (Franco Maria Ricci, Milano)
Strappa, G. (2014) *L'architettura come processo* (Franco Angeli, Roma)
Vaccaro, G. (1933) *Schemi distributivi di architettura* (Giuseppe Maylender Editore, Bologna)
Vitellozzi, A. (1936) 'Il nuovo palazzo postale di Napoli', *Edilizia moderna* 23

The development of property and land ownership by the Ursulines of Trois-Rivières: The monastery and the city.

Cynthia Aleman
École d'architecture de l'Université Laval. Québec, Canada
Keywords: Ursulines, land tenancy, urban form

Abstract

The present case study focuses on the land tenancy of the Ursulines' Monastery in Trois-Rivières (Québec, Canada). The case study seeks to describe and understand how the land and properties supported the development of Nuns' monastery missions and affected the urbanization of Trois-Rivières. The master in architecture research question explores how real estate, in the city and the countryside, supported in means, in resources and in cash, the Ursulines' Monastery. It contributed to the construction, the maintenance of the premises and their educational and charitable mission. Indeed, studies suggest that a religious community and its built heritage affect the form of urban development and still participate today to the cultural identity of their environment (Martin, 2007).

The methodology is inspired by Gauthier's Muratorian diachronic morphological analysis applied to the Ursulines and Augustines real estate holdings in Québec city. This case study connects the economic transactions and the material transformations of the Ursuline's properties. Subsequently, material evidence is used to make a qualitative assessment aiming to contribute to the operational history. An interdisciplinary approach is inevitable; architecture, history, and geography are closely related disciplines. The study will attempt to establish guidelines for a possible future requalification of the site and a likely change of use following the decline of the religious community. By studying the structuring role of this Catholic institution in the formation of the urban cultural landscape of Trois-Rivières, the research will undeniably contribute to understanding the processes of urban morphology of Quebec.

Introduction

The Roman Catholic Church played a key role in the foundation and development of Quebec, Canada. Certainly, during and since the French colonization in North America, the Roman Catholic Church in its various components - parishes, religious communities, clergy - contributed significantly to the establishment and development of the economy, culture, education, and health domains. Through their actions, the authorities responsible for the religious institutional framework had an important impact on the design of the built heritage and the urban and rural cultural landscapes. Under those circumstances, the research aims to expose a better comprehension of the impact of religious communities on urban morphology. Canadian studies suggest that a religious community and its built heritage affect the form of urban development and still participate today in the cultural identity of their environment (Martin, 2007).

The present case study focuses on the land tenancy of the Ursulines' Monastery in the city of Trois-Rivières (Quebec, Canada). The case study seeks to describe and understand how the land and properties supported the development of Nuns' monastery missions and affected the urbanization of Trois-Rivières. The master in architecture research question explores how real estate, in the city and the countryside, supported in means, in resources and in cash, the Ursulines' Monastery. Notably, material evidence suggests that it contributed to the construction, the maintenance of the Ursulines' premises and their educational and charitable mission. Thus, the hypothesis states that there is a dynamic interaction between the resources of the religious community, their land tenancy development and evolution of the City of Trois-Rivières. An interdisciplinary approach is inevitable since architecture, history, and geography are closely related disciplines.

First of all, it was imperative to build a general comprehension of the religious order, the role they played in the colony as one of the four founding religious communities of New France, and their adaptation to the new geographical, socio economic and cultural context.

In the sixteenth century, Angela Merici became the foundress of the Ursuline nuns in Brescia, Italy. She managed to inspire other young ladies to take care and instruct other girls, to visit hospitals and even prisons. Since the very beginning, the Ursulines were very involved in the societies they lived in. It is only in 1544, that Pope Paul III recognizes them canonically under the name of "Congregation of St.Ursula". On June 13, 1612, Pope Paul V supported the transformation of this congregation into a religious order. The Ursulines made the vows of poverty, chastity, obedience, education to young girls, and care of the sick and needy. Ever since then, the religious order established a tendency towards an autarkic way of living even if generally the community's financial resources came from charity, rents, tuition, dowry, among others. In addition, it is important to point out that they were traditionally good administrators of their land and properties. For example, they had tenants who occupied apartments or houses adjacent to their monasteries insuring a regular income (Biver & Biver, 1975).

Since their arrival in 1639, the Ursulines followed the example of Marie of the Incarnation dedicating themselves to their main mission in New France: the education of the colony's young French and Amerindian girls. In the late seventeenth century, the small village of Trois-Rivières, was seeking educational and hospital services (Jutras, 2009). In 1697 Bishop Saint-Vallier, Bishop of Quebec, asked the Ursulines already established in Quebec City, to open a mission in Trois-Rivières. At that time, the city of Trois-Rivières had only about 32 families. Given the low number of inhabitants, not only did the bishop entrust them with the educational services, but also those surrounding the hospital (Grandmont, 1998). Upon arrival in New France, the Ursulines had to adapt to the new context of colonization. The order faced the idea of opening a hospital while their legal status and their original purpose was to dedicate themselves to teaching. In fact, the Constitutions clearly state a specific mission that led them to pronounce a fourth vow, namely to educate girls (Germain, 1997). However, the Ursulines agreed to send nuns to devote themselves to this new mission, thus opening the hospital, the convent and the boarding school in 1697 (Jutras, 2009). Indeed, this is how since their arrival in Trois-Rivières, the

Ursulines had to adapt their work, their charitable mission and their needs to a new demographic context.

In 1700, the Ursulines settled in a new property located on Notre-Dame street, in the Hertel fief. It is in this new small building with five windows that they began the mission of the small community (Jutras, 2009). These properties were acquired with the adjacent land by Bishop Saint-Vallier, which then gave it all away to the Ursulines. Over the years, the properties and land ownership of the Ursulines grew by purchases, inheritance, endowment, donation, exchange, etc. Notably, 40 years after their arrival to the city of Trois-Rivières, the Ursulines already had a huge amount of land and property in the city (Grandmont, 1998).

In New France, an ideal way to help religious communities to support themselves was to provide them with a seigneury. The religious and civil authorities of Trois-Rivières wanted to help the community, because they recognized that their dual purpose of services to the community implied a great need of resources. Thus, Bishop Saint-Vallier along with the civil authorities, collaborated to donate land to the Ursulines which would permit not only a fixed income, but also an increase of it by intelligent exploitation and administration. In 1701, the Ursulines of Trois-Rivières received their first monastic property: the Saint-Jean fief. Later, the Ursulines acquired the seigneury « Rivière-du-Loup-en-Haut » today situated in the city of Louisville (Marie-Marguerite, 1888).

On the other hand, it is important to point out that the specific circumstances permeated the religious order to import and excel with their long established autarkic way of living and their good administrative methods. More specifically, these circumstances were: the vast spaces and geography, the French culture and ways of doing, their seigneurial system for land distribution, and the pressure to populate the colony. This new demographic context of the colony mixed with all the other socio-economic and cultural factors suggest that the Ursulines became important actors to have enough influence on the development of the city throughout their management of real estate in the city and the countryside.

Methodology

The methodology is inspired by Gauthier's Muratorian diachronic morphological analysis applied to the Ursulines real estate holdings in Québec City. In North America, Gauthier's research work is amongst the first case studies to apply the theoretical framework of the Italian school on urban form (Gauthier, 1997, 2003). In the light of his work, this case study seeks to connect and undestand the religious order as an actor influencing economic transactions and the material transformations of the urban tissue. Hence, the research relies on material evidence of the Ursulines properties and documents from archives such as cartographic documentation, insurance plans of the city, notarial acts, etc. Similar to Muratori's idea of using « il rilevamento dal vero » with his apporach and contribution to the operational history of Venices' urban form, the research equaly uses on site measured drawings and an architectural analysis of the evolution of the Ursulines' Monastery (Muratori, 1959). Indeed, material evidence is used to make a qualitative assessment aiming to contribute to the operational history.

During the historical research surrounding the Ursulines of Trois-Rivières, it was noticeable that the religious order had input on the production of space. Hence, the attention was drawn to the production process of space related to the religious order. The idea was based on the aforementioned production process and the fact that it required resources to create spaces at the territorial, urban and architectural scales. As a result, the spaces created at various scales generated, in return, the resources which then refueled the cyclic process.

At the architectural scale, spaces produced by the Ursulines are the buildings and dependencies fulfilling their needs for shelter and those according to the services they provided to the community; school and hospital. Notably, the production of technical drawings combined with cartographic restitution and their analysis, have thus far, helped the understanding of the state of the existing buildings and their historical and morphological

transformations since 1699. The work includes a 3D modeling exposing the transformations of the buildings and the site; demolitions and additions through time. By studying the architectural scale, links can be made to the urban and territorial scales by looking at continuity and rupture phases in the transformation and morphology of the building itself. For instance, constructions, demolitions, additions, and reconstructions, involving the monastery and its dependencies on site, have shown to be extremely interconnected to economic transactions motivated by the Ursulines and historical happenings influencing their mission and priorities. By dating the walls, partitions and existing structures, the exercise at the architectural level, reflects on what should and could be kept on a future restoration or change of use. Additionally, the exercise demonstrates the interrelation between the morphology of the building, the site, and the urban area owned and administered by the Ursulines.

Through the cartographic restitution and the diachronic study, one can testify to important changes of the urban form. When concentrating on the urban scale, with attention to the Hertel fief containing the monastery and its site, one can notice the planification of new residential developments and changes of location for some streets. For instance, throughout the passage of years, one can see new streets and parcels appear and how land gets divided and sold. Another example of spaces created at the urban scale are the vegetable gardens the Ursulines maintained to support their tendency towards autarky as other religious communities in New France did as well. Frequently, gardens and vegetable gardens were a type of resource supporting their missions. Besides, this is where we see how the proper use of urban space can be of great support to a religious community. In effect, these gardens also contributed to the morphology of the site and had a direct impact on the landscape at the urban scale.

The production of space at the territorial scale can be approached in several ways. For example, Grenier summarizes and explains the impact of the seigneurial system by focusing on distribution, division, and land management. On the other hand, we can also look at the new missions founded by the Ursulines of Trois-Rivières in other cities. Grenier argues that the seigneurial system has greatly shaped Quebec's territory and landscape. More specifically, the seigneurial system is connected to the production of space encouraged by the Ursulines at the territorial scale, by referring to the evolution of agricultural land and the impacts it had on the cultural landscape of the St. Lawrence Valley. In fact, using the topography, rivers and streams, the direction of the implementation of land was outlined to promote the irrigation of these. Consequently, the lines guiding agricultural landscapes perpendicular to water sources is through the stately geography a way of creating spaces and shaping the landscape (Grenier, 2012).

Within the production process of space created by the religious order, interrelationships appeared between socio-economic and cultural contexts where historical happenings had an effect on the evolution of the building, the site, and the fief. Afterwards, the use of a timeline was necessary to gather all the main historical events in a chronological manner. The historical events were then divided according to the three different scales; architectural, urban and territorial. The practices of the religious order and their impact on morphological change at different scales was now more obvious by stressing the social and economic context under which the Ursulines acted.

For example, in 1701, the Ursulines of Trois-Rivières received their first monastic property. With the new income and resources produced, in 1715, it was possible for the nuns to make a first extension to their monastery. Later, in 1722, lord Michel Trottier, sold most of his seigneury to the religious community. After the transaction, a second extension is made to the monastery. Consequently, this information leads us to believe that the increase of resources owned by the religious community, through the acquired assets, could explain the interrelationships of development surrounding their land and their mission. Other important historical events having a huge impact on the religious community can be identified, such as, fires. The first fire was in 1752, it was then necessary to rebuild, but the event was seen as an oportunity to make major extensions to the building and to accomodate to the growing needs of the religious community. A second fire occured in 1806 and by the next year the reconstruction was made possible with the help and

support of other religious communities and important religious and civil authorities. After 1879, we can identify a period involving several new constructions and extensions in the architectural and territorial level. In fact, extensions and new buildings are made to the monastery in Trois-Rivières and the religious order helps with the foundation of other Ursulines' monasteries. Through the passage of time, slowly but surely, it is possible to identify the decay of the production of space process by the Ursulines of Trois-Rivières.

Forming process

Levy describes the Italian work on urban morphology and summarizes Muratoris', Caniggias' and Aymoninos' ideas. He cites Muratori on understanding the urban or territorial environnement, which resumes to knowing: what it's made of, how it's made, how it works, and how it evolves. Additionally, it's about finding the laws that connect different periods of urban development; laws that integrate all the factors. Every situation of equilibrium in the history of the city represents a starting point for new crisis. There is a cyclic law that exists and connects the different periods of urban development and their spatial location. Furthermore, cartographic restitution is simultaneously planning and historical interpretation (Levy, 1992).

Over the years, the Ursulines acquired parts of the Hertel fief by purchases, inheritance, endowment, donation, exchange, etc (Grandmont, 1998). Surely, the development of the fief was equally influenced by the demand of residential space influenced by the industrialization of the city and how the nuns managed their land accordingly. As a sample, the Hertel fief was shortly examined. The fief is described as being approximately 175.6 meters wide by 998.8 meters long. In 1833, the Ursulines owned 18.3% of the total area of the land. Suddenly, in 1879, the religious order owned 74.9% of the total area of the land. Today, the Ursulines own 25.7% of the total area representing the Hertel fief. Even though this part of the research is still to be refined, the short examination of the fief was enough to notice how the religious order had enough vision to acquire almost the totality of the fief, exploit the land, develop a residential district, and sell according to their needs and priorities. This exercise should be redone more rigorously by mixing a synchronic and diachronic analysis depending on the cartography and information available. Furthermore, in the search of similarities on the way of planning or developing land tenancy, the dimensions of the streets and parcels should be compared to those revealed by Gauthier on his analysis of Quebec City (Gauthier, 1997). Moreover, the same analysis should be done for another sample in the seigneurie of the Ursulines of Trois-Rivières. This would permit one to compare the impact of the religious order on the urban form of the city and the countryside.

Conclusion

Until now, the research findings suggest that the space production process by a religious community is closely related towards their tendency of an autarkic way of living. In fact, religious communities in New France produced spaces at different scales not only to meet their needs, but also to ensure autarky since these spaces regenerated more resources in return. Moreover, the space production process provides longevity to the religious community promoting direct impact on urban form despite the fluctuating resources and historical events. Proof is in their existence and maintenance in our contemporary days in spite of the huge religious detachment Quebec's society has evolved into. Thus far, the production process of the space generated by the Ursulines of Trois-Rivières throughout the years supports the hypothesis that the produced spaces have allowed a dynamic interaction between the resources of the religious community, their land tenancy development and the evolution of the City of Trois-Rivières.

The biggest challenge today is to make our contemporary society understand how much these religious communities had a huge impact on the history and consolidation of the French colony in North America. It is imperative to put aside the resentment that Quebec's society seems to have developed towards the Roman Catholic Church after the

progressive dissociation between the 1920's and the 1970's as described by Ferretti (Ferretti, 1999). The built heritage of these religious orders is not only limited to the architecture of the monastery they lived in, but as this research attempts to prove, their influence went a long way by creating and molding spaces in three different scales until affecting the urban morphology of the city they lived in. The study will attempt to establish guidelines for a possible future requalification of the site and a likely change of use following the decline of the religious community. By studying the structuring role of this Catholic institution in the formation of the urban cultural landscape of Trois-Rivières, the research will undeniably contribute to understanding the processes of urban morphology of Quebec.

References

Biver, P., & Biver, M.-L. (1975). *Abbayes, monastères, couvents de femmes à Paris des origines à la fin du XVIIIe siècle* (Presses universitaires de France, Paris).

Ferretti, L. (1999). *Brève histoire de l'Église catholique au Québec* (Boréal, Montréal).

Gauthier, P. (1997). *Morphogenèse et syntaxe spatiale des tissus résidentiels du quartier Saint-Sauveur de Québec.* (15684 CaQQLA Mémoire (M. Arch.)), Université Laval. Retrieved from Accès via ProQuest http://proquest.umi.com/pqdweb?did=738269921&sid=8&Fmt=2&clientId=9268&RQT=309&VName=PQD Available from Bibliothèque de l'Université Laval Ariane database.

Gauthier, P. (2003). *Le tissu urbain comme forme culturelle: morphogenèse des faubourgs de Québec, pratiques de l'habiter, pratiques de mise en oeuvre et représentations* (McGill University).

Germain, T. (1997). *Autrefois, les Ursulines de Trois-Rivières : une école, un hôpital, un cloître*. Sillery (A. Sigier, Québec).

Grandmont, J. (1998). Les Ursulines de Trois-Rivières: Présence d'une communauté. *Continuité*(77), 32-34.

Grenier, B. (2012). *Brève histoire du régime seigneurial* (Boréal).

Jutras, C. (2009). Au coeur de la ville: Les ursulines de Trois-Rivières. Cap-aux-Diamants: La revue d'histoire du Québec(98), 10-15.

Levy, A. (1992). La qualité de la forme urbaine: problématique et enjeux. (Rapport pour le Ministère de l'Équipement, du Logement et des Transports, Secrétariat permanent du Plan urbain), 2-31.

Martin, T. (2007). La mouvance de la culture canadienne-française vue à travers l'évolution d'une institution catholique en région. *Canadian historical review*, 88(1), 41-88.

Marie-Marguerite, Sr. (1888). *Les Ursulines de Trois-Rivières : depuis leur établissement jusqu'à nos jours*. Tome premier. Trois-Rivières (P.V. Ayotte, Québec).

Muratori, S. (1959). *Studi per una operante storia urbana di Venezia* (Vol. 1)(Instituto poligrafico dello Stato, Libreria dello Stato).

Morphological Interaction of the Bazaar and City in Iran, Past and Present

Ario Nasserian, Valeriya Klets, Kiumars Poursamimi
Draco PhD School, "Sapienza" University of Rome, via Gramsci, 53 00197, Rome, Italy
Keywords: Bazar, Middle Eastern City, Urban Modernization, Urban Growth

Abstract

This paper is aimed at studying and finding the relation between the general places of trading in Middle East and Asian countries (Bazaar) with the city from a morphological point of view. Historically many cities in the region depend hugely on a trading economy and in some cases have been initially founded as a site of commerce and trade. There have been some efforts to relate the growth and structure of urban tissue of the city to the form and structure of the Bazaars (Pourjafar et al. 2013), but they mostly fail to show what happens when in the modern period, cities started to grow bigger and the needs of the city could not be satisfied with a single central Bazaar.

General types and shapes of trading spaces and their forms in urban and rural places are discussed and the relation between them and the tissue around them is categorized. It would be shown how the Bazaar has encouraged or discouraged the expansion and formation of the city in certain examples. As another step the relation of Bazaar with different building types will be described. Other part of the research would be to study the effect of the city on the Bazaar complex, and how the expansion of city will change the morphology of the Bazaar. Having displayed this bilateral relationship a final conclusion on the morphological interaction of the Bazaar and the city can be defined.

Introduction

Bazar is the general name given to the place of commerce in most of Middle Eastern and middle Asian countries and is a major element in the Islamic cities from Morocco to Kazakhstan and a Prominent and essential one in Iran. It can be a temporary small scale marketplace, which usually once a week farmers and villagers bring their goods to the city to sell in it or a very centralized market place which gives service to a whole city. Bonnine defines the Iranians Bazars in this way: "The Iranian bazar is a unified, self-contained building complex of shops, passageways, and caravanserais, interspersed with squares (Meydan), religious buildings, bathhouses (Hammam), and other public institutions. This traditional commercial center is usually roofed with vaulted ceilings made from fired brick, although the outer branches may be open or have only makeshift coverings of wood or reeds". Fig-1-a shows a traditional Bazar in the city of Kashan in the center of Iran. Different buildings which are integrated into a unified urban complex and their spatial relation are visible, a clear visual representation which verifies Boninne's definition.

Iran is located in a crossroad of the commercial roads connecting traditional ancient centers of commerce: Europe and the Mediterranean basin to India and China, Arabian and African lands to Asian ones. Thus Commerce has always been a very important aspect of Iranian life. In the Islamic era, this importance of commerce and its place, bazar, grew higher as bazar was recognized by Islamic law as a designated locus of sociability, Because the purpose of transactions in the bazar was beyond a mere exchange of commodities; it was an exchange in the context of religious norms and cultural values (Ashraf, 1989). This concept is reflected in Bazar's structure, as can be seen in Fig-1, it is connected to almost every aspect of the life in an Islamic city: Hygiene structures and water resources through cisterns and bathhouses; Religion through the mosques, tombs and shrines; education through Madrasa's, connection with other cities and regions of the country and/or importing and exporting goods through Caravansaries and city gates, etc. Also it was usually surrounded by and even in many cases interwoven with the housings and residential areas.

Bazars were not only a place for commerce, but also a place for production of goods, there were smiths, shoemakers, saddlers, potters in bazars and usually they had their own respective quarter. Tailors, cooks, bakeries, confectionaries,… were usually dispersed in the whole bazar. Thus bazars were sufficient for all possible human activities or needs. With the growth of the cities due to population growth and immigration from rural areas the dimensions of the cities increased in the recent century so a single bazar was not able to provide all the needs and services for a large city. So other forms of market places appeared in the city, ranging from single shops usually on the first floor of the residential or commercial buildings to huge Megamalls. (Fig-1-b)

This paper focuses on relations between the Bazar complex and the rest of the city and tries to find patterns which define the morphological relation between city and Bazar.

General Forms of traditional Bazars

There are two major kinds of bazars: daily or temporary and permanent. The temporary bazars lack a certain structure and building, usually they consist of a large clear land in rural areas which once a week people gather in to sell their goods. Even in some cities and for some goods (usually fruits and vegetables) this large pieces of land were considered as a daily bazar, without having any structures in them.

On the other hand the bazars in the cities were certain complexes of buildings or one may say a network of highly specialized buildings which are structured according to the needs and functions of city in order to maximize its effectiveness in giving service to other parts of the city and its surroundings. These bazars have specialized and structured shape, consisting of shops, corridors, intersections, connections with other buildings, means of protection, warehouses, etc.

This permanent bazars have some major forms, according to Rajabi (2007) they can be axial, multi axial, crossing and deformed. Fig-1-c shows this general forms of bazars.

Figure 1. General Forms and parts of Bazar

City/Bazar Interface

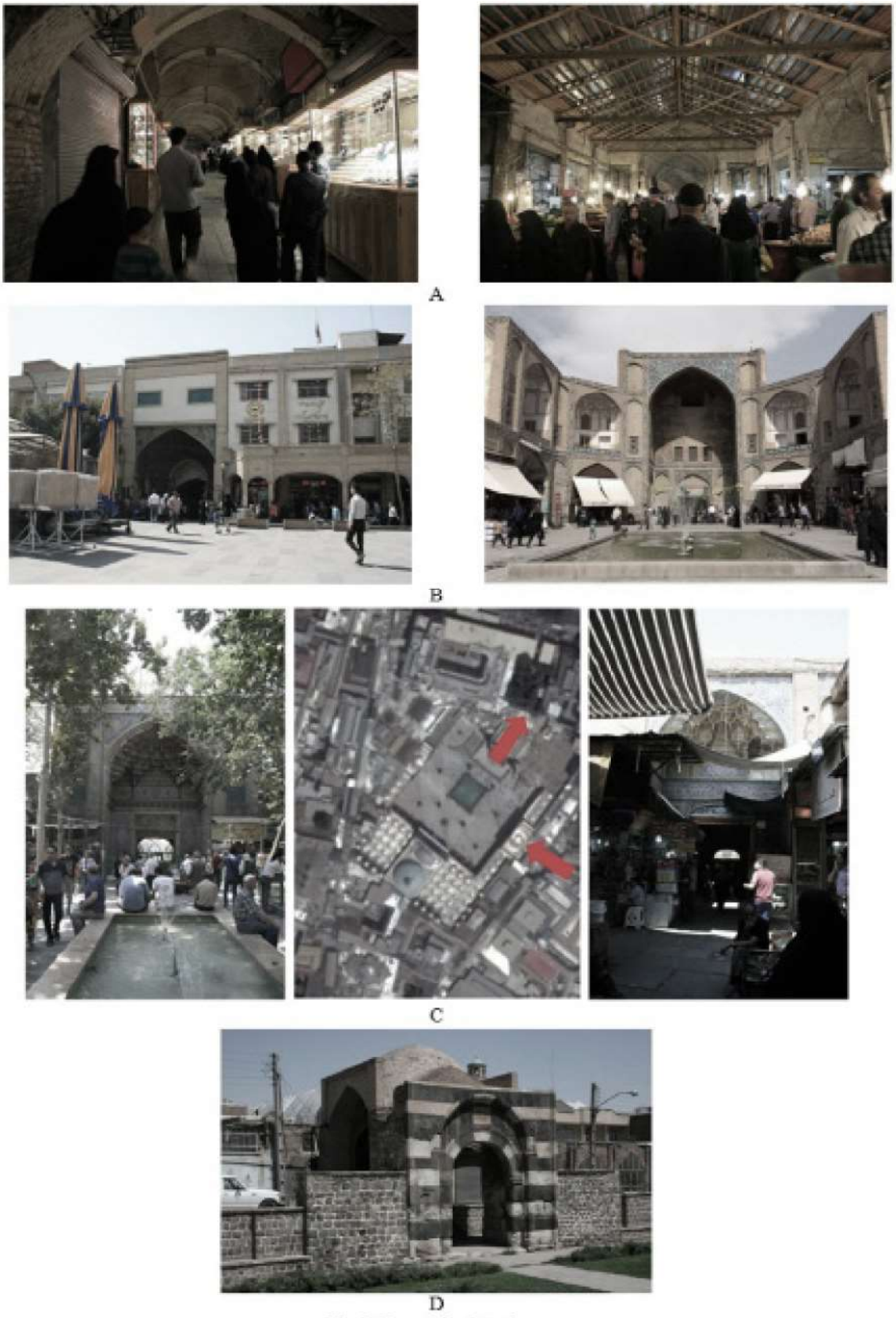
There are four general types of interfaces between bazar and the city tissue: continuous interface, discontinuous interface, hinges and exterior joints.

A continuous interface occurs when there is a gradual transfer between bazar and the city tissue without any clear point separating bazar from city. We can call it an organic interface too, because it happens naturally during the formation phase of the bazar/city. These interface/joints are very rare nowadays, because either expansion of bazar will make that interface a part of the bazar or because of urban interventions like building new streets or large squares which cut the bazars and destroy these organic interfaces. With careful study one can still find these joints. Fig-2-a of the Zanjan's Bazar shows the traditional bazar and a part that is added to it later and thus is not covered by brick domes, but instead is covered by wooden trusses and metal sheets. One can see the old joint of bazar and its neighborhood which was a very simple point of transformation from bazar to the city tissue.

If a bazar expands in an organic way, these joints can move to a new place in the end of the bazar's new ending point. So one can follow the history of bazar's expansion by following the place of these interfaces. These interfaces can be found in the points that covering, structure or even the kind of profession in a bazar changes.

Second type of joints which can be called artificial or inorganic interfaces are those that connect bazars to a street or square or even city tissue with an exact point of parti-

Figure 2. Bazar/city Interfaces



tion between them. Usually these points are considered to be the entrance of the bazar complexes and are built like a portal. This ability of becoming a monument-like element in the city which can segregate the bazar from the rest of the city and also give it a symbolic importance, makes these interfaces to function in a way that is more than a mere urban node, it will function as an urban pole. They can limit the bazar expansion in to the city tissue and thus determining its size and form. These joints are the most common ones these days. Fig -2-b shows two examples of these joints.

Third type of the interfaces of the bazar and the city are joints which connect bazars to specialized buildings, usually mosques. This kind of joint makes the building to work as a hinge or link between bazar and the city. As usually this specialized building is going to remain at its place for a very long time, or in case of a mosque almost forever, these kind of joint can be named also fixed joints. An example of the function of these hinge buildings can be seen in Tehran, the congregation mosque of Bazar works as a hinge between bazar and the northern border of it (Fig-2-c). It shows that the passage through bazar ends at a gate to the mosque inside bazar which then enters the central court of the mosque through an iwan and is connected to the rest of the city through another iwan.

Fourth type of the interfaces of the bazar with its surrounding area is an exterior joint, it connects the bazar to the border or boundary of the city, not its main tissue. These kind of joints are almost non-existent these days, as due to the expansion of the cities bazars don't reach to the borders of them anymore. Fig-2-d shows these joints or interfaces between city and bazar.

The type of the bazar/city interface has a substantial impact on the bazar's expansion to the city and thus the city/bazar interaction. The effect of these interfaces on the city/ bazar morphological interactions is shown in the table-1.

Table 1. Effect of city/bazar interfaces on the morphological interaction of city and bazar

	Organic (continuous)	Non continuous	Fixed (link)	Exterior
Bazar Expansion into the city	Growth is normally possible and it will occur very smoothly and organic, if growth from this joint continues, it would be in the traditional form of bazars.	Bazar is cut, and if it continues expansion after this point, the form of the bazar is going to change from the traditional bazars to the modern shopping neighborhoods	Bazar will have a static point there, after the specialized building which acts as a link, it usually continues smoothly to the urban texture	The bazar will end there, as the end of the city was the city wall and moat, now replaced with wide streets, it is a dead end point for the bazars.
Role in the City	Not a significant point, even it can gradually change place in the course of time	A significant point of the city which goes beyond being an urban node and usually acts as an urban pole	The specialized building makes a link and so the transition to the urban fabric which is on the exterior point of the link usually works as a portal	It used to be a city gate, but now with the expansions of the cities it is just a simple and unimportant interface of urban texture and bazar,
Important feature	Change in the form and structure of bazar	A place of the change of the urban tissue from the maze of bazar to a separated land lots	A point which will not change over the time	A place of the change in urban tissue form, usually from the traditional form to the modern forms

The Bazar-City Relation

One can study the relation of city and bazar in three different phases of the age of the city:

A- When the city is forming as a small center of population which its economy does rely on its the agricultural production (young city) but is getting gradually more dependent on trade revenues.

B- When the city is stablished, usually gets a form of a center of political power and importance for the government and is defended by walls and other means and has certain limits.

C- When it starts from being a traditional small/average city to expand very fast toward being a metropolis in the modern era.

The interesting point is that although in today's Iran all the major cities are in the third phase, but due to the variety in size and population of the cities all these different phases of transition is visible in different cities.

A- The Bazar-City Relation in the formation phase of the city

Bazars were an influential element in the formation and shaping of the cities. The influence of commerce in the general sense of the word on the formation of a city is such powerful that many cities were founded or flourished because they were on a trade route and were visited by merchants regularly. Habibi(2012) Discusses and shows that almost all the main cities in Iran were founded close to the main commercial roads, Silk road from Europe to China and Spice road from Europe to India (Fig-3-a). With a close study of a more detailed map of Fig-3-1 One can note that these cities were founded either based on the distance between stations that were needed for the commercial caravans to stay for rest and protection -which were called Caravansaray- or where there was a small population center close to these major trade routes.

The Process of formation of the city works in this way: usually on an intersection of a road connecting a local center of population and a main trade route, places of selling goods or exchanging them with each other were formed. With the gradual growth of these centers the need for some residential, service and specialized buildings and the need to protect them made it necessary to have a wall around them, and so a city starts to exist because of the commercial places inside it (Fig-3-b)

B- The Bazar-City Relation in the stablished city

Here one can see the first strong influence of the city on bazars, as bazars were a center of goods and wealth, they had to be protected inside the city walls and as they had to be within the reach of the Caravans, they had to be close to the city gates too. So they usually had a linear or multi linear structure with one end at one of the city gates which were close or adjacent to the main trading route passing the vicinity of the city. A classic and clear case is the bazar of Tehran, Fig-3-c shows how this bazar starts from the southern gate of the city, and ends in front of the citadel.

C- The Bazar-City Relation in the expansion phase of the city

Population growth and immigration from rural areas to cities resulted in a fast growth of the cites and their bazars, bazars gradually grew and swallow some residential tissue of the cities and also some of the specialized building in or around them -which were not functional anymore due to modern technologies- like Caravansarays, Hammas and cisterns. Fig-3-c shows an example, Tehran's original bazar and its modern day size, limited only by the streets built around it.

Many traits of bazar were lost, it didn't contain many specialized buildings not related to commerce any more, it was not in touch with the residential tissue any more, it had no direct access to the area outside of city, it lost its connection to the governmental buildings.

There is a big difference between the first two phases and the last one. Unlike the first two, in the last phase, the city is not getting any influences from bazar and instead is influencing it in every possible way. Fig-3-d shows this phenomenon.

Figure 3. City/Bazar interaction

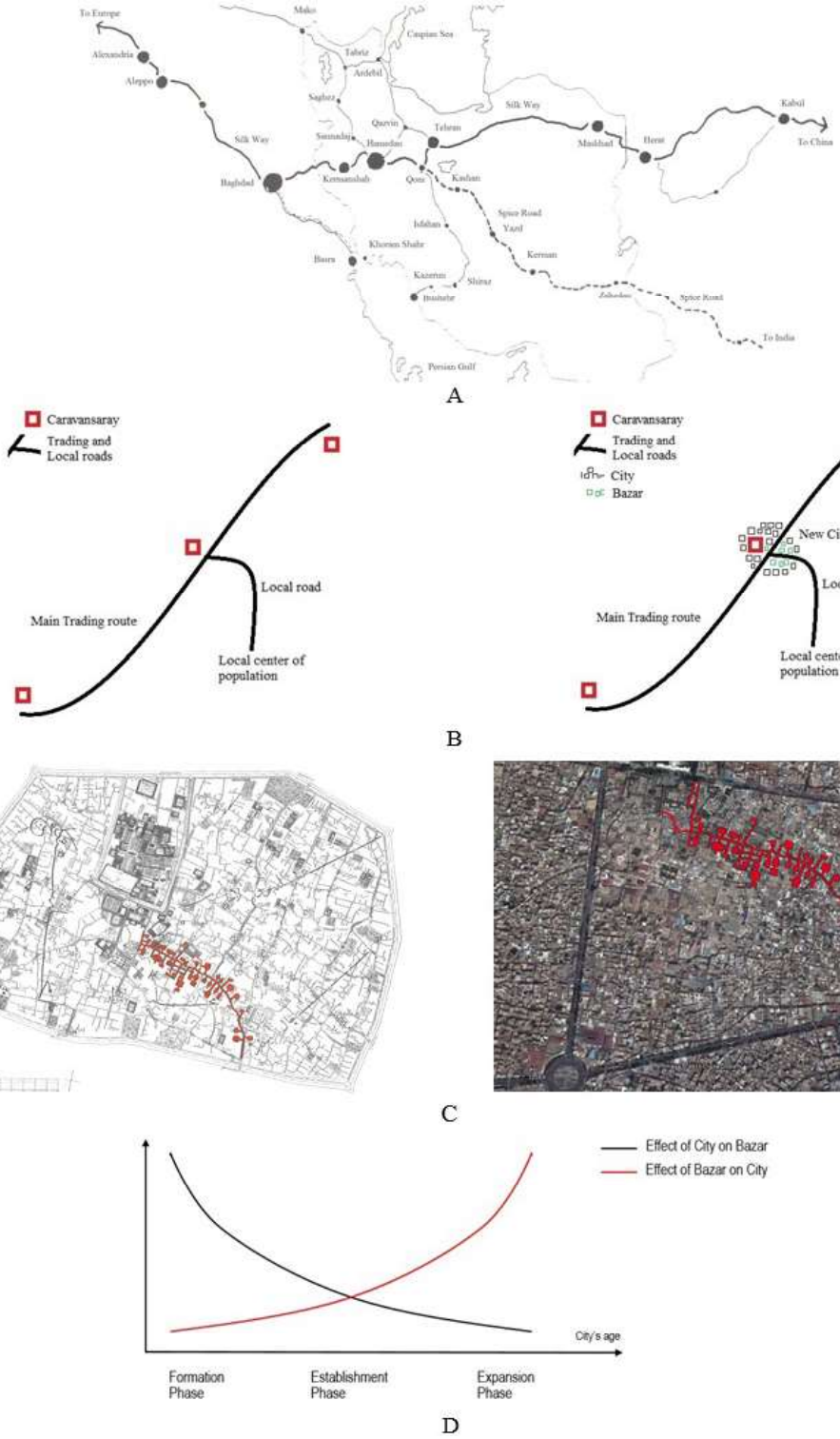
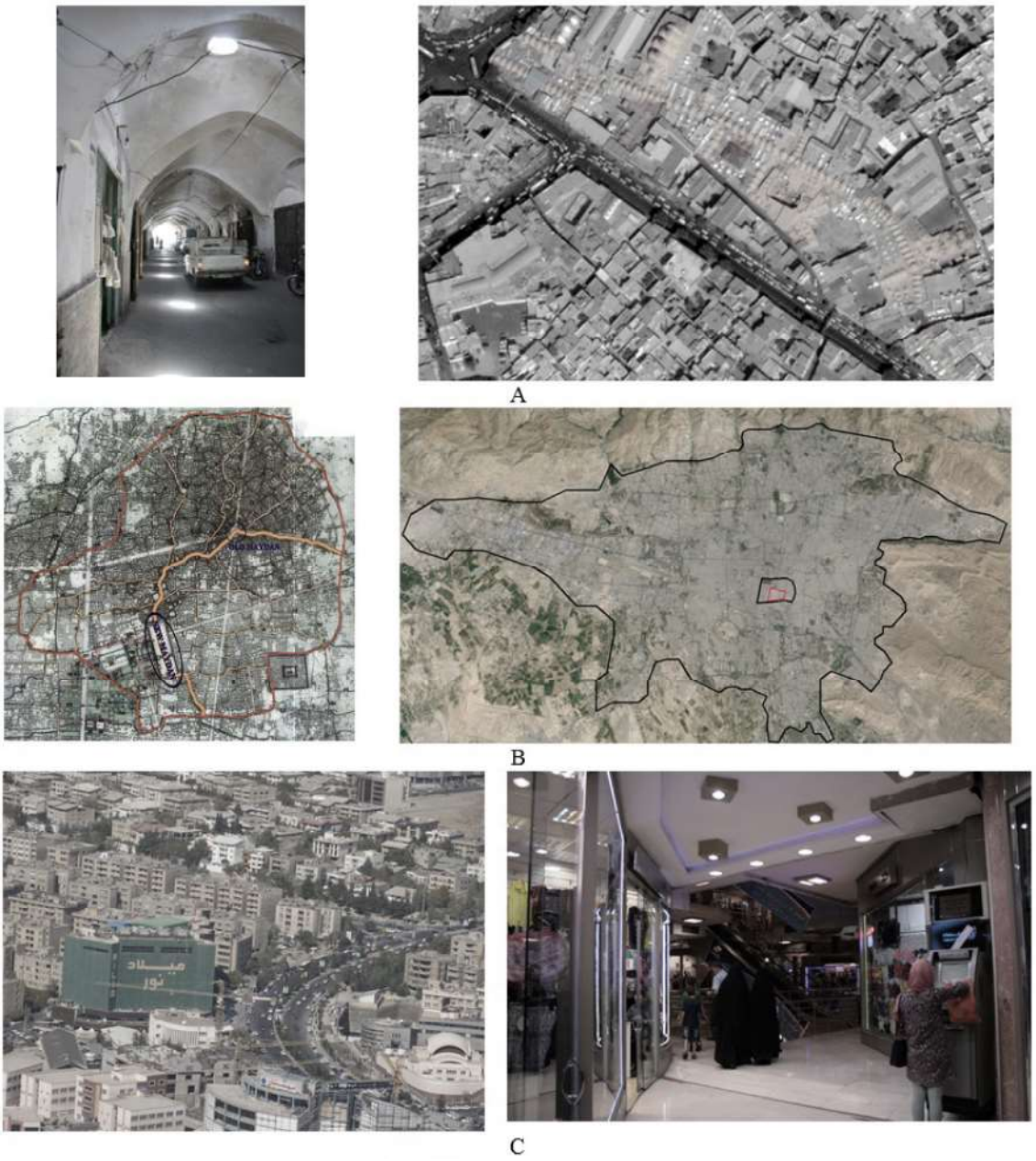


Figure 4. Bazars in recent times



Similarity of Urban Tissue and Bazar, Past and Present

In the initial two phases -formation and establishment- there is a similarity of micro forms between city tissue and bazar, they are both complicated mazes of alleys and streets, bazar turns and twist through the city and doesn't follow a regular pattern, It follows the same pattern of the city neighborhoods. Covered or uncovered, spaces of bazar, like the spaces of the city, are designed to limit the movement and reduce the speed (Allain,2004). It has to be considered that like the whole city, the process of formation of neighborhoods also usually started from bazars, so it was natural for the city tissue to follow the tissue form of the bazars (Habibi, 2013). Thus here one can reach to the conclusion that in fact it is not the bazar which follows the residential tissues, but instead it forms the microform of that tissue. It was necessary for the safety and functions of a bazar to have a complicated and irregular form, thus they never had straight and regular urban pathways, and even if they were built in place of a previously regular tissue, the form of the existing tissue was changed drastically to generate this complexity. (Rapoport, 1997)

Because of this harmony of texture between them, bazars and city were connected, bazar didn't have a clear boundary in respect to the city. It had its own sub structure of main streets and alleys, small and usually covered squares in the intersections and…., the city didn't follow this sub structure but was connected with it in a very smooth way. City and its bazar were integral. There were some (of course few) examples of the residential buildings in bazar and the people used a lot of city's infrastructure (Baths, Mosques, Cisterns,…) so there was no physical discontinuity between bazars and the city, except in the parts of bazar that precious materials were sold. (These parts were protected by gates and guards). This Similarity has resulted in three major aspects:

1- A thriving economy which usually resulted in the city to grow bigger, made it necessary for the bazar to grow too. This growth could have been done gradually and smoothly by transforming the city tissue to the bazar tissue. A look at Tehran Bazar in recent time shows how the bazar has swallowed its residential neighboring quarters. (Fig-3-c)

2- Changing the function of different parts of bazar because of the changes in needs as the times goes on or as a result of the will of a patron is/was relatively easy. As an example it can be seen in Fig-14 that how a covered bazar in Qom has transferred to a gallery which the cars can pass through it. Fig-3-a also shows how this ease of changing the function makes it possible for the city to get back the space from the bazar, this phenomenon happens in cities in which the bazar loses its prosperity.

3- Bazars can be used as a mean to connect two part of the city and unite them to make a bigger conglomerate. Sometimes this phenomenon was so fundamental that the bazar was the unifying element of the whole city. This phenomenon has been discussed by Pourjafar et al. (2014) in a case study of Isfahan their result is shown in Fig-4-b, and it has to be noted that this was not limited to this city.

Metamorphosis of the Bazar in the Modern period

One may think that with the growth of a city its bazar will grow too, but it is not happening in reality, especially in the cities which are getting a huge size. As an example one can have a look at Tehran. The city has grown and thus some places in the city have a distance of more than 20 kilometers to the original bazar.

Naturally the bazar will function only in its vicinity and so has an area of influence which doesn't cover the whole city. The solution of the old Isfahan which was shown in Fig-4-b is not possible due to distances. So there would be a need to new shops and shopping centers which can work in the scale of neighborhood, thus raises the need for the new forms of commercial spaces which were shown on Fig-1-b.

Due to change in the phenomenon of the city growth, now usually the new neighborhoods start from some residential tissue and according to certain development plans of the municipality, then the commercial zones start to develop, so these tissues are completely segregated from each other, and usually they are in form of some adjacent shop-

ping malls. Fig-4-c shows a more recent tissue of the city of Tehran. It is obvious that there is no more harmony and connection between commercial and residential zones, the shopping centers does not include any other specialized buildings, so they are not connected to the residential tissue by any means, directly or indirectly.

But these shopping malls are affecting the original and traditional bazars too. In order to be able to compete with them, both in their area of influence and in the whole city, and also due to the huge increase of the prices in the middle parts of the city, a huge change in the form of the city takes place. An increased part of the Bazar is destroyed and rebuilt in the form of the modern shopping centers. Fig-4-c shows this process.

Conclusion

In the initial phase of the formation of a city commerce and hence bazars, have a very important role. They not only can trigger the start of city but also dictate its shape and form, so bazars and old city centers have the same maze-like characteristics of an Islamic city. With the passage of time the effect of the bazar on the shape of the city decreases and the city takes the leading and shaping role of the commercial sectors, including bazars.

A phenomenon that has been studied was the importance of the city/bazar interface in the future expansion or development of bazar. Interfaces were categorized into four general types, some of them allow for the expansion of bazar in an organic way and some of them, including the connections to the residential buildings act as a dead end for the bazars.

Modern construction materials also change the face of city commercial centers completely, this change occurs in two ways, demolishing the old and building brand new ones inside the traditional bazar and constructing modern multi story shopping centers which are completely cut from the city tissue.

Bazars were not just a place of distributing goods, but also a place of producing goods too, nowadays these activities are completely stopped and thus the original form of bazar for these activities (For example in order to reduce the sound pollution) is not needed any more, this has resulted in a change in the shape of bazar and eliminated the need to a maze-like structure. In some cases this maze like morph of bazars used to function as a unifying backbone for the city, which has also been diminished, largely due to the size of the cities. These mazes used to contain some specialized structures like Caravansarays, but with the shift in the functions of some bazars from small vendor places -A brand new commercial space in form of the first story of the residential buildings adjacent to the main streets has taken this role now- to the large amount distributor of the goods, these spaces have all turned to warehouses. Bazars were multifunctional complexes of specialized buildings, but new commercial centers are single functioned, all the hygine, religious, … buildings are eliminated from commercial spaces.

References

Bonnine, M.E (1989) 'Bazar i. General', Encyclopœdia Iranica, Vol. IV, Fasc. 1, pp. 21-25; available online)http://www.iranicaonline.org/articles/bazar-i) accessed online at 2 June 2015
Hajighasemi, K., Navaii, K. (2012), 'Adobe and imagination', Soroush Publication, Tehran, Iran.
Ashraf, A (1989) 'Bazar iii. Socioeconomic and Political Role', *Encyclopœdia Iranica*, Vol. IV, Fasc. 1, pp. 30-44, available online (http://www.iranicaonline.org/articles/bazar-iii) accessed online at 2 June 2015
Rajabi, A. (2007) 'Morphology of Bazar', Agah Publication, Tehran, Iran.
Habibi, M. (2013) '*A Historical analysis of concept of city*' (Tehran university press, 13th, ed., Tehran , Iran).
Allain, R,(2004) , "*Morphologie urbaine. Géographie, aménagement et architecture de la ville*", Paris, A. Colin, coll. U Géographie
Rapaport, A. (1977) '*Human Aspects of Urban Form*' (Pergamon Press).
Pourjafara,M., Amini, M. , Hatami Varzaneh, E., Mahdavinejada, M.J., '*Role of bazaars as a unifying factor in traditional cities of Iran : The Isfahan bazaar*' ,Frontiers of Architectural Research, 3, (Higher Education Press Limited Company).

Chair_Vítor Manuel Araujo Oliveira
University of Porto, Portugal
Co-Chair_Antonio Camporeale
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

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Learning in Las Vegas: The Urban Gaming

Maria del C. Vera, Susanne Newbury
School of Architecture, University of Nevada Las Vegas, USA
Keywords (3-5): Gaming, Game Theory, Urban Planning, and Startups

Abstract.

Gambling is a growing business. Most American states have some form of legalized gaming. It is a force and a pastime that permeates all human interactions. Cuff and Sherman suggested that urbanist ought to "Borrow[ing] from practices like gaming, game theory, risk management, and arbitrage"; they see gaming as "nudging the future forward." Many believe this is a dangerous premise yet, a few of us argue that cities are already a gamer's platform. Specifically if one considers that gaming is rooted in taking chances, in knowing the value of a wildcard, and in risking everything for one lucky strike. These acts, like game theory, which often deals with understanding competitive logics and outcomes between participants is how policymakers, city commissioners, speculators, citizens, bankers and others take chances and arbitrage land use in urban places.

Pairing gaming logics with urban design practices is alien to most urbanist yet the physical apogee of this synonymous is Las Vegas as it expands, stagnates, and shrinks according to gaming logics. Unlike Venturi's signage explorations, this study rejects the glitter and learns from the dynamic logics of markets, political, and sociological behaviors that permeate the city. It exposes Vegas' unpredictable-predictable urban-gaming-logic. It uses the history of the original and the fake, socio-political agendas, and its build scenarios to explain that SimCity or Second Life games nudge the future of urban design.

Introduction: The Scene

Gambling and game playing are growing businesses. Most US states have some form of legalized gaming; it is a force and a pastime that permeates all human interactions. Recently, in his contribution to *Fast-Forward Urbanism: Rethinking Architecture*, Stan Allen suggested that urbanists ought to "borrow from practices like gaming, game theory, risk management, and arbitrage," using them to "nudg[e] the future forward." (Allen, 2011) Yet a few of us would argue that cities across the globe are already a gamer's platform (Lobo, 2005), particularly if one considers gaming's roots in taking chances, knowing the value of a wildcard, and risking everything for one lucky strike. We contend that these acts and strategies--like game theory, which often deals with understanding competitive logics and outcomes between participants and stakeholders--are how policymakers, city commissioners, speculators, citizens, bankers and others take chances and arbitrage urban land. Our work, therefore, learns both from the historical development of Las Vegas and the simulated sociopolitical agendas of open gaming platforms like SimCity to make good on the idea that the algorithmic logic of the game and the category error drives the future of urban plan.

The Logic

Pairing gaming logics with urban design practices may seem alien to most urbanists. Yet the physical apogee of this condition—the city of Las Vegas, Nevada—is quite familiar, even as its process of expansion, stagnation, and contraction plays out below the public eye. In Vegas, envisioning the future of the city transcends traditional planning and city officials. From its inception, Las Vegas has been enshrined in architectural and planning literature as an ad hoc configuration, a space of control both in terms of the private development of its built environment, and of the way that environment shapes urban experience. (Venturi, Scott Brown, and Izenour, 1972) A century-old enterprise, the city presents a situation symptomatic of most American towns of the late 1800s and early 1900s that predate urban planning as a professional practice: its growth emanates from private commerce rather than public or civic infrastructure. (Reps, 1992)

But unlike other present-day metropolises founded in the same period, Las Vegas remains an urban outlier. Largely free of comprehensive city planning into the 1980s (when a circulation improvement plan was proposed), today it operates in slightly accelerated terms of development: that of accentuated risk, speculative potentials, and centrally codified rather than coordinated central plan. Such operative measures parallel gamers and game theorists whose strategic use of rules that purposefully *diversify, arrange, and re-organize activities*. (Nonacs, 2013)

In video game design, success depends on well-crafted rules, which in turn organize data, codes, and permit a completed plan of action. Game designers, like architects, begin with concepts, layouts, and specific interface ideas to build characters and completed scenarios from the back-end. Conversely, game theorists, like urban planners, focus on the participants (those playing the game), and in particular on their behaviors, or in other words, the image-forward personae of self-presentation. (Goffman, 1959) Focusing on possible player *behavior* helps game theorists and designers forecast a full range of probable scenarios, and in turn the consequent complementary strategies to yield optimal outcomes. These gamers and game theorists are increasingly applying these procedures beyond game design—to economics, biology, sociology and evolution studies. They are also emerging in urban planning, where the goal is to experientially "play out" urban life.

Planning Las Vegas and Beyond Learning from Las Vegas

We began by re-examining ideas of modern and postmodern urbanism in contrast to Las Vegas's unique development. Vegas lies outside familiar models of urbanism based on the Modernist city. It never needed diagnosis or palliative care to overcome

a suboptimal industrial past, and even its mid-century technological optimism fell within the United States project of individuality and automobility (Moehring, 2014), rather than more familiar, socio-governmental projects in master-planned efficiency such as Brasilia or Chandigarh.

In fact, to the extent that Vegas has been enshrined in architecture and planning studies, its singularity is to be located in the *absence* of coordinated intent or design intellect in its urban footprint. Venturi and Scott Brown's 1968 Las Vegas studio at the Yale School of Architecture observed this as a novel condition of the city, and argued for a distinctly opposing view, one that looked to embrace identity, or urban brand, as both primary resource and primary draw for speculation. Their goal was to collect real data as a means of urban study. Focused on the emerging American landscape of commercial sprawl, this form of urbanism was wary, precisely, of utopian perfections, and instead set out to document the characteristics of the city as it stood in the practicable present. Rather than rejecting existing environments or mimicking a historical style to form a proposal or charrette, they accepted the commercial condition of the actual city per se as itself a lucid ends. The book that followed in 1972, *Learning from Las Vegas*, heralded a new outlook for urban thinkers, one that signaled today's reliance on information to determine analysis and operation. (Venturi, Scott Brown, and Izenour, 1972) Rather than looking to past conditions to judge or critique existing built environments, *Learning from Las Vegas* suggested that the *experiential environment*, rather than the plan, acts as stimulant for urban speculative action.

Forty-five years on, it seems obvious enough that *Learning* from *Las Vegas* provided a lens into the commercialization of urban design, forecasting the urban productions of the last quarter of the twentieth century. More potently for us, it is hard to ignore that Las Vegas generated both a model for aggressive city branding and the cognitively disrupted image of the city skewered by finance capital in the twenty-first century. (Jameson, 1984) Casinos as both buildings and businesses rise and fall on the whims of global financing, altering skylines, street names, and the fluctuating status of service sector employment. (Forbes, 2014) Not just single-family homes, but entire developments and neologistic regions of the urban palimpsest spring up only to fail to come to market. (Coolican, 2010) What were once the delirious signs of a new reality of commerce's architecture are now in a sense the opaque windows onto the financial operation of cities: a game of real estate arbitrage whose instrument of trade shifts from tract home, to sports arena, to bespoke coffee shop, to vacated construction site. An empty lot, it turns out, may be more powerful and remunerative than its signs and decorated sheds. (Newbury, 2013)

This speculative look at emptiness is the opposite of Venturi, Scott Brown and Izenour's [VSBI] canonical method. Rather than "the ordinary…lead[ing] you to the extra ordinary" through phenomenal, experiential, and commercial identity, today's Vegas operates as a data-driven exercise building from a blank, even intangible slate. The immaterial dynamics of the logic of data permeate and permute the physical city, its economy, and its political, and sociological behaviors. In so doing, Vegas' contemporary urbanism learns from the simulated sociopolitical agendas of open gaming platforms--like Sim City or City Skylines where gaming is clearly not a tangible product, but rather an experiential one.

Similarly, the logic of gaming produces not physical results, but hypothetical actions and strategic behaviors. Here, in the absence of a strong urban plan, Vegas conditions contingent instead of coordinated behaviors of operation. This correlation relates gaming--the industry term for both gambling as well as video games--to the political strategy of game theory, in which realized outcome is delayed in favor of anticipatory strategy, or in other words, hypothetical behaviors.

Urban planning in Las Vegas plays out according to game theory's classic formulations, such as the prisoner's dilemma. Each participant, each *interest*, acts autonomously and strategically in her own best interest without knowing all the rules of the game to undermine cooperation or communication and maximize personal outcome. Success or failure is dependent on the behavior of other players, who seek to expose each other's vulnerabilities. Behavior in game theory is complex, due to the range of variables and characteristics each player possesses. Such complexity multiplies when game theory is

applied to city development, whose expected outcome of prosperity greatly raises the stakes for forms of action. The issue here is that in focusing on the ideological trajectory of urban planning as it evolved in the twentieth century, we found a distinct type of urban development unfolding in the early twenty-first, one that draws from game theory and experimental computational models of economics.

Reading The Strategy

The Downtown Project of Las Vegas [DPLV] is a leading example of what we believe to be the first urban design startup implemented with strategies derived from platforms such as SimCity, and the interactive decision modeling of game theory. Currently in its manifold phase of development, the DPLV continuously reinvigorates its operations and seeks to generate urban growth through marketability. DPLV was spearheaded by Tony Hsieh, a computer science graduate of the John A. Paulson School of Engineering and Applied Science at Harvard, and his partner Alfred Lin, an expert in statistics/applied mathematics, the successful developers of multiple start-ups like the online advertiser LinkExchange (acquired by Microsoft in 1998 for $265 million) and online retailer Zappos (acquired by Amazon in 2009 for $1.9 billion). As the current CEO of Zappos and the DPLV, Tony Hsieh has been quoted as saying "*I first thought I would buy a piece of land and build our own Disneyland,*" but worried about a remove from the "outside world," decided "*it was better to interact with the community*." (Pratt 2012)

Tony Hsieh's campus grew into a 60-acre sandbox, taking up whole city blocks in Las Vegas' depressed Downtown. Relocating his headquarters from the Las Vegas suburb of Henderson to a neighborhood of vacant casinos and motels also required "seeding" the area with "new inhabitants"—his young, upwardly mobile employees. "*He leased the former City Hall — smack in the middle of downtown Vegas — for 15 years. Then he got to thinking: If he was going to move at least 1,200 employees, why not make it possible for them to live nearby? And if they could live nearby, why not create an urban community aligned with the culture of Zappos, which encourages the kind of 'serendipitous interactions' that happen in offices without walls? As Zach Ware, Hsieh's right-hand man in the move, put it, 'We wanted the new campus to benefit from interaction with downtown, and downtown to benefit from interaction with Zappos.' The only hitch was that it would require transforming the derelict core of a major city.*" (Pratt, 2012) As we see it, this wholesale transformation bears much in common with the ground-up ethos of risk at play in games and gaming.

To transform the core of a city, as explained by gamers and SimCity designers, the player has to follow rules. "*If a Sim lives within 400 meters of their job, they will walk to work. In fact, Sims will walk anywhere as long as their desired destination is within 400 meters. So try to create self-contained miniature communities where Sims can walk everywhere. This requires the zoning of residential, commercial, and industrial buildings within close proximity of each other. The only downside is the pollution and low land value associated with dirty (tech level 1) factories in industrial zones. But if you can promote the growth of clean (tech level 2) and high tech (tech level 3) industry, you can mitigate these concerns while promoting a pedestrian-friendly city*." (Knight, 2013)

Since 2009, DPLV has self-propelled multiple initiatives to retain its inhabitants within the peripheries of its campus and implanted projects: the Container Park mini-mall, the Life Is Beautiful music festival, The Market specialty grocery store, the Airstream Living alternative community, and more. But, after six years of playing with his "integrated Disneyland," Hsieh's experiment has failed to achieve real urban traction, and its external community growth has yet to materialize. This is a clear point of anxiety for Hsieh and DPLV, a problem both attempt to address as an issue of quantified metrics—rules and codes that could anticipate and optimize the result of the game. Potential investors become potential players, the range of their possible actions charted as hypothetical outcomes. As a reporter described of one such "seeding" effort to lure an investor, "*Hsieh also came up with a way to calculate the value of people who 'subscribe to downtown Las Vegas' but don't want to live there. He'd tried to persuade Jake Bronstein to leave New*

York in 2012. Bronstein is the founder of Flint & Tinder, which makes the 10-Year Hoodie and other clothes. Hsieh invested in the retailer and says Bronstein comes to Vegas one week every month. 'We did the math on Jake. When he's here, he's out about 12 hours a day, 7 days a week, for 12 weeks a year. So he's worth 1,000 collisionable hours, too.' Hsieh began to apply this metric to investments that might not make money for a while. 'Say we want 100,000 collisionable hours a year from an investment. That works out to 2.3 hours per square foot per year' he says, with a slight smile. 'If we're going to invest in a 3,000-square-foot restaurant, we can do the math and see if it yields that 2.3 hours per square foot per year. We're kind of agnostic about what goes into a space. It's are you going to yield those collisionable hours? If not, we can say no without judging the quality of the idea." (Berfield, 2014) Such calculations signal despair as if the game has to advance or fold.

The Playoffs

The analogy of gaming and DPLV is fragile in its temporality: games are resolved in a matter of hours or days, and urban planning takes time. Human interactions and cities are not forged immediately, rather the characteristics of sustainable community building are decades in the making, and more organic than mathematical. (Jacobs, 1961) Our initial--and still limited--study of DPLV shows that the production of scenarios from the perspective of game theorist has *potentia*l for future urban planning trajectories, yet in practice is a tool of economic speculators, whose interest in fast-tracking and flipping developments has more in common with start-up culture.

While game theory is now in the developer's toolkit, and may useful as design strategy, it cannot be a pure method to forge complex and fully realized urban evolution. As the game theory culture of the start-up is applied to re-developing cities and towns across the globe, planners, builders, and civic stakeholders must strategically calibrate methods for taking chances, developing networking relationships with real planners, data driven computer scientists and politicians—all of whom have difficulties with long term commitments, assisting citizens and taking smart risks to advance the characteristics of emerging sustainable urban practices.

Game theory is a practical contender for sustainable urban practices to improve, as long as it does not remain primarily in the realm of economic speculation. Game theorists, like urban planners, focus on participants [those playing out the game], and in particular on their behaviors. This interpellated focus on potentiality and behavior creates gaming, and urbanism, as a vetted practice of hypotheses—an experiment in cities with the dimensions of the laboratory. Game theory needs time to test and improve strategies; cities need time for similar reasons. In the case of DPLV, a half-decade is insufficient to imagine a developed community, yet has been sufficient to produce a new scenario for urbanism: the territorial campus geared toward land arbitrage. Prices in downtown Vegas are skyrocketing, as families and elders swiftly evacuate the zone.

References

Allen, S. (2011) "Urbanisms in the Plural: The Information Thread" in *Fast-Forward Urbanism*: *Rethinking Architecture's Engagement with the City* (Princeton Architectural Press, Princeton)
Berfield, S. (2014) "Tony Hsieh Is Building a Startup Paradise in Vegas" *Bloomberg Business* (http://www.bloomberg.com/bw/articles/2014-12-30/zappos-ceo-tony-hsiehs-las-vegas-startup-paradise) accessed 14 June 2015.
Coolican, P.J. (2010) "Boom-bust Era Leaves Architectural Scars across Valley" *Las Vegas Sun* (http://lasvegassun.com/news/2010/dec/19/cookie-cutter-buildings-scar-vegas-beauty/) accessed 14 June 2015.
Forbes (2014) "Deutsche Bank Finally Sells Cosmopolitan for $1.73 Billion" *Forbes Magazine* (http://www.forbes.com/sites/greatspeculations/2014/05/20/deutsche-bank-finally-sells-cosmopolitan-for-1-73-billion/) accessed 14 June 2015.
Goffman, E. (1959) *The Presentation of Self in Everyday Life* (Anchor, New York).
Jacobs, J. (1961) *The Death and Life of Great American Cities* (Random House, New York).
Jameson, F. (1984) "Postmodernism, Or: The Cultural Logic of Late Capitalism" *New Left Review* 146, 59-92.
Knight, D. (2013) "SimCity Zoning Guide" *Prima Games* (http://www.primagames.com/games/simcity/strategy/simcity-zoning-guide) accessed 14 June 2015.

Single-family housing developments at Small Spanish Cities: the case of Toledo

José M. De Ureña, Eloy Solis, Borja Ruiz-Apilanez, Inmaculada Mohino, Mayte Arnaiz
Escuela de Arquitectura, Universidad de Castilla La Mancha, Avd. Carlos III s/n, 45071 Toledo, Spain
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Abstract

Small cities in Spain (between 50 and 100.000 inhabitants) have exploded since the 1980's, being transformed from compact densely built ones into spatially discontinuous and mixed density ones. This process that started earlier in large Spanish cities has only taken place during the last urban development economic cycle in the small ones at a very relevant speed. The paper analyses the single-family housing developments at Toledo and its surrounding municipalities. It studies their morphology, showing their neat differences and suggesting that they cannot be just identified as single-family urban developments. Consequently, the paper suggests a taxonomy of these urban areas according to their origin, urban location and type of rationale. The ten proposed types are: Industrial based new villages, Self-built/informal developments, New small developments within the dense built-up urban fabric, Incremental expansions around rural settlements, which include two types, adjacent and expanding the historic morphology and transformers of the historic morphology, New developments disconnected from the traditional built-up fabric (urban or rural settlements), which include four types, collage ribbon developments, big land propriety developments besides roads, developments based on natural areas and wildlife habitats and developments based on the creation of new spatial amenities (i.e. golf courses). The paper presents maps and spatial data of the different single family homes areas of Toledo.

Introduction

Research on urban morphology in Spain was synthesised by Vilagrasa (1998). In 1971 Sola-Morales (1997) proposed an urban growth morphology model (Formas de Crecimiento Urbano) for the Spanish metropolises (mainly Barcelona), which has been used profusely by Spanish scholars. He suggested ten urban growth morphologies (Figure 1): -Historic core, -Absorbed villages, -Ensanches, -Peripheral lot subdivisions -Industry and industrial colonies, -Garden cities and suburban single-family habitats, -Marginal infra-housing areas, -High-rise detached apartment building areas , -Industrial states, -Big Community services and -Big infrastructures. Some years later, scholars have added four other recent urban growth morphologies: -Production and thematic parks, -New ensanches, -Commercial centres and headquarters areas and -Diffuse urbanization.

Spanish small cities (between 50 and 100.000 inhabitants) have exploded since the 1980's, transforming a dense and compact urban pattern into a present discontinuous, sub-regional and mixed density urban one. The role of single-family habitats in the new components of this new model is very relevant. Single family Spanish habitats have not been subject of abundant research, only from a sociological point of view (Leal & Cortés, 1995) and focusing in the immediate vicinity of metropolises (López de Lucio, 1998; García & Gutiérrez, 2007). Furthermore, their development at/by small size cities at a certain distance but within areas of metropolitan influence has not been studied.

Literature Review

In Spain, as in many other southern European countries, there is a recent increasing number of low density single-family housing urban developments, changing the traditional dense character of urban residential areas, and transforming traditional Mediterranean dense cities into diffused/dispersed urban areas (Monclús, 1998). Nevertheless, their morphologies have not been the purpose of recent research.

On the contrary, what has been the object of recent research is the reconfiguration of peripheral urban areas as a consequence of the new (or not so new) gated communities, the new commercial/leisure centers, other major private community services (private universities, sports and country clubs, etc.) (Pereira, 2006; Fedriani, 2009; Sposito, 2009) and density (Vicuña, 2012).

Gated communities (either single-family or condominiums) are not recent, their first evidences appear during second half of the XIX century. Billard, et.al. (2005) synthesize the abundant literature about this topic. There is consciousness about their relative im-

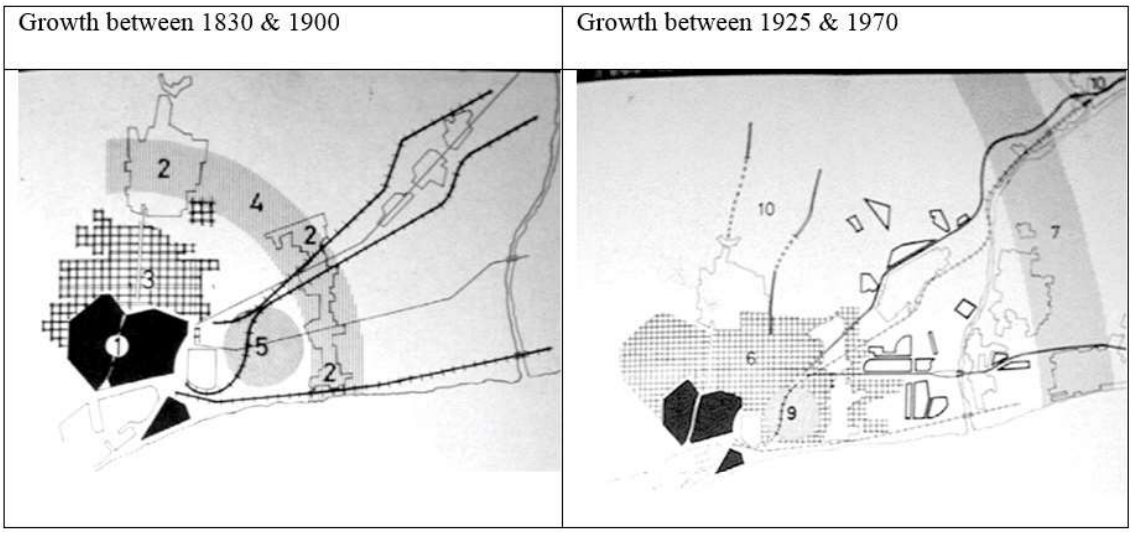


Figure 1. Urban Growth Morphologies proposed by Sola-Morales for Barcelona

portance by country, and during the last years they have become very relevant in Latin America (possibly due to security reasons) and are of different relevance in European countries.

In parallel, and during the last three/four decades Spain has intensified a diffused/dispersed territorial occupation. This has meant that numerous Spanish scholars and planners have paid attention in their research, their professional practice and their legal one to the dispersed/diffused city and its economic, social and environmental consequences.

From this point of view, there are several lines of research about the diffused/dispersed city:

- *Diffused/Dispersed city and sustainability*. These are studies focused on indiscriminate land urbanization and private vehicle mobility, and also include arguments on increased energy and water consumption (OSE, 2005; 2010, Gómez Mendoza, 2007; Troitiño, 2007; Naredo, 2010)
- *Diffused/Dispersed city and social cohesion*. These are studies focused on economic segregation, but also on other questions such as less public participation or weaker social networks (Díaz y Rodríguez, 1989; Díaz et al., 2006)
- *Diffused/Dispersed city and vital cycle*. These are studies on factors that encourage residential location change, such as age, socio-professional structure, family size, etc. (Módenes, 2006; Susino, 2001, 2007; Susino et al., 2007; Pujades, 2009)
- *Diffused/Dispersed city and spatial organization type*. Characterizing the physical peculiarities of these urban tissues (Brandis, 2008; López de Lucio, 1998; 2004). Nevertheless, the study of single-family environments has had little attention.

Empirical Study –Toledo- and Methodology

The empirical study methodological sequence is composed of four phases:

i.-The Toledo functional area or sub-regional city is characterized.

ii.-Based on this characterization, several single-family habitats are selected.

iii.-Case study habitats were provided with a digital cartography based on the Cadastre and 2011 aerial photographs. Cartography differentiated lots, buildings and public spaces (streets, parks, etc.) and public facilities (schools, etc).

iii.-Several parameters where measured based on this cartography: percentage of land occupied by buildings, building/land ratio, number of dwellings (detached, semi-detached, row).

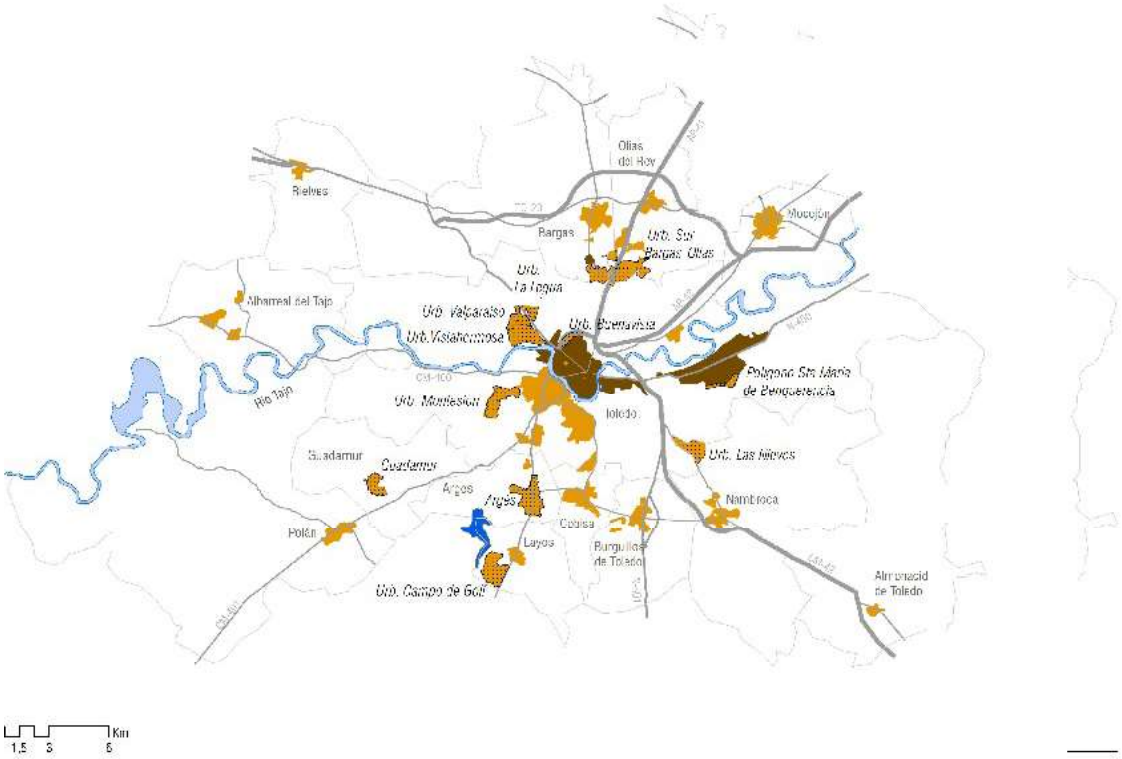
iv.-Parameters were synthesize in a comparative Table, including number of dwellings, lot size, building typology, public facilities, in order to charaterize their urban morphology.

Toledo municipality is located 70 km south of Madrid, has 83.000 inhabitants in 2014 and has become the capital of the new Castilla La Mancha region in 1983 (five provinces). At present around 5% of its labour force commutes to Madrid daily and a similar number commutes from Madrid to Toledo, thus, it starts being integrated into metropolitan processes.

The Toledo municipality contains four differentiated and separated urban areas, due to the topography and hydrology and the present explosion of Spanish cities, and increased by the protection of its historic centre since the 1950's. On top, as many other small Spanish cities, Toledo has recently become a sub-regional city articulated with the surrounding municipalities and this incorporates two other types of areas (one already existing in Toledo). Thus the Toledo urban area is composed of three predominantly dense areas, the historic centre on the river meander roc, the almost continuous dense expansion to the north and the Polígono de Santa Mª de Benquerencia 1960's new town, located between 4 to 8 km east of the historic city, and two types of predominantly single-family habitats, the historic small settlements including their adjacent new expansions and the new "isolated" single-family developments (Figure 2).

Based on this understanding of Toledo's layout, preliminary studies were conducted to adequately select a small number of representative single-family habitat case studies. Trial and error process lead to 11 case studies (nine were studied in 2011 and two in 2015).

Figure 2. Toledo, surrounding municipalities and Case studies of Single family housing habitats



Results

The results show that single-family habitats of Toledo since the 1950's can be classified into:

- Industrial based new villages
- Small zones inside the dense urban area
  - Self-built/informal developments
  - Modern edge developments
- Incremental expansions adjacent to small historic settlements (Villages)
  - Expanding the historic morphology
  - Transforming the historic morphology
- New developments disconnected from the traditional built-up fabric (urban or rural)
  - Collage ribbon developments besides roads
  - Large rural Properties developments besides roads
  - Developments based on natural areas and wildlife habitats
  - Developments based on the creation of new spatial amenities

The characteristics of single-family housing areas are as follows (Table 1 and Figures 3 and 4):

Industrial based new villages have existed for a long time, the last ones in small Spanish cities are from the 1950's. The case studied at Toledo, the Weapons Factory Poblado Obrero was built between 1948 and 1953 and was supposed to be larger (650 houses, while today it has only 150) and with more/better public facilities (Campos and Rodríguez, 2008). Initially, this area was not surrounded by other urban areas, but some years later the urban expansion reached it (see Figures 3.a.).

Nevertheless its irregular perimeter, consequence of its smaller size than planned and the security distance from the factory, this single-family area has a regular pattern and an interesting urban structure, together with an important supply of public facilities (pri-

Table 1. Characteristics of single-family housing areas

ZONE	Single-Family Building Type							Planned Public Facilities (FA) & Green Zones (GZ)*					Streets	FA, GZ & Streets
	Percentage (by type)			Average Plot Size [m^2] (by type)				m^2 FA/house	% Surface FA	m^2 GZ/house	% Surface GZ	% Not Done	%	%
	Row	SemiDet	Detached	Row	SemiDet	Detached	All							
TOLEDO CITY														
Weapons Factory Village	8	***81	11	395	400	435	403	73	11,2	40	6,4	-	22,6	40,2
S. Bárbara Self-built/Informal	100	0	0	70	-	-	70	0	0	0	0	-	****43,3	43,3
Buenavista	100	0	0	196	-	-	196	6	4,2	15	10,5	2,1	20,9	35,6
Polígono Sta Mª Benquerencia	99,8	0,2	0	152	157	-	152	16	4,0	102	24,7	13,9	30,6	69,3
VILLAGES														
Guadamur	42	18	40	295	376	585	425	75	9,5	60	7,6	8,8	20,2	37,3
Argés	53	16	31	299	388	787	464	33	5,5	46	7,5	41,4	23,7	36,7
DISCONNECTED DEVELOPMENTS														
Montesión	0	0	100	-	-	3.398	3.398	48	1,1	510	11,9	91,9	9,7	22,7
Vistahermosa- La Legua - Valparaíso	63,8	19,3	16,8	248	467	1.844	559	149	11,3	314	23,9	76,2	16,7	51,9
South of Olías del Rey and Bargas	37,9	18,5	43,6	130	642	815	523	21	2,6	53	6,7	7,2	21,2	30,6
Las Nieves	0	0	100	-	-	1.295	1.295	61	3	188	9,3	61,6	13,9	25,2
Golf development at Layos	0	0	100	-	-	904	904	**865	**43,3	0	0	5	13,4	56,7

** Over all houses present and planned (empy lots)*
*** Most of it composed by the Golf course*
**** Detached buildings with one side at the property limit and thus without windows in that side and thus considered as semidetached*
***** Considering half the width of the surrounding streets*

mary school) and plaza/park compared to its size. This mostly semi-detached area has a medium size average lot of 403 m2, most with a similar size, although they reproduce the socio-professional factory segregation with different building sizes, its internal streets are narrow, 6 m., and buildings and fences are (have been) identical, producing a sense of place.

Small zones inside the dense urban area expand the urban area besides what is already urbanized and adapt to the existing surrounding spatial order. Two subtypes are found: early self-built or informal developments and modern ones (see Figures 3.b.).

Self-built/informal developments were created during the 1950's, at suburban areas of low economic land value at the time, and were very cheap developments (Serrano, et. al. 2004). Sixty years later, most are becoming more central and redeveloped. In some cases their morphology was the originating one of new suburbs, along existing paths with ribbon or tree-shape forms and in other cases resulting from small subdivisions with regular geometry. These areas lacked urban structure, street pavement, utilities and public facilities, which in most cases were added later. Most buildings consisted only of ground level, were very simple and small, with very low building quality (partly derived from self-building). Plot size is very small, most of it built (initially or later on) facing the streets.

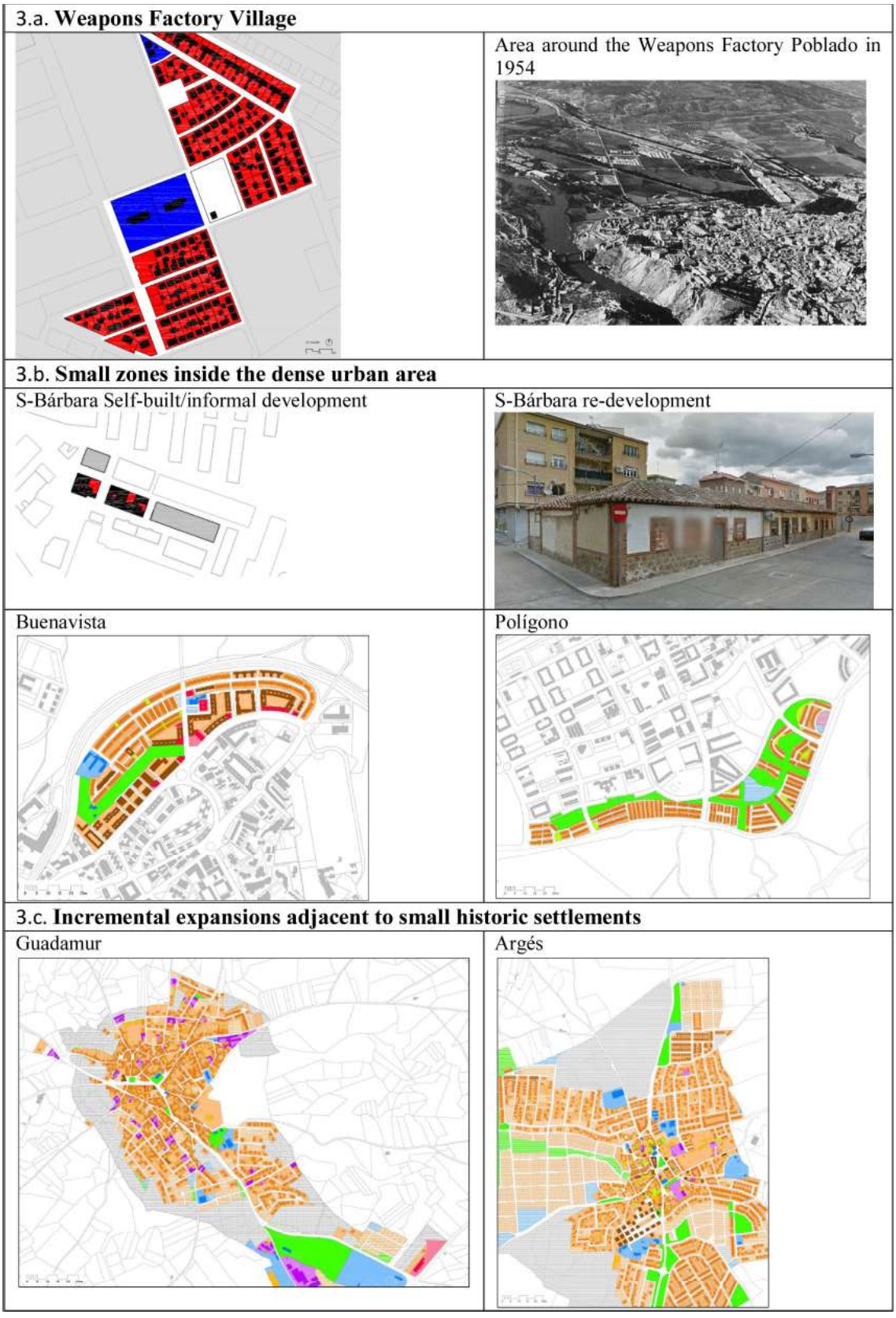
The case studied at Saint Barbara neighbourhood is located along one of its oldest paths/streets and is a plot subdivision. Nowadays about half of its 70 m2 plots have already been demolished for redeveloped (grey area in Figure 4), by substituting a few of these houses by 3 to 4 floors apartment buildings without enlarging streets and multiplying by 5 the total building floor.

Modern edge developments are located at remnant areas between high-rise building areas and main distributing roads, and are fairly recent (after 1980): two cases are studied, Bellavista and Polígono areas. Row houses with small plots and very small gardens. Their advantage is being besides dense urban areas with abundant private and public facilities. The average plot and building size is bigger in Buenavista, with higher income persons, than in the Polígono.

Their layout is similar and adjusts to the built up and road edges. The available facilities are small, since they have to serve also the adjacent dense areas, with substantial differences between them. The Poligono area public development is better equipped (102 m2/house of green zones and 16 m2/house of facilities), while the private Buenavista development is less equipped (15 m2/house of green zones and 6 m2/house of facilities).

Incremental expansions adjacent to small historic settlements (Villages) are located at their interstitial and adjacent areas besides urban areas composed predominantly of traditional single-family buildings, with public facilities, commerce, utilities and street/road network. These new single-family developments, spatially and functionally strongly relying on historic settlements, are of a reduced size, and the resulting shape is a juxtaposition of different patterns (see Figures 3.c.).

Figure 3. Single Family developments besides historic settlements



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Two sub-typologies can be distinguished: expanding and transforming the historic morphology. In the first ones, the historic settlement initial layout maintains it preponderance, with the new developments adapting to it, while in the second ones, the layout of new developments predominates and changes the overall urban shape. In these second cases developments are normally bigger in size and provide greater green zones and public facilities than the first sub-type ones.

The new developments studied at Guadamur maintain the historic morphology, have both detached and row morphologies, being 40% detached, 42% row houses and 18% semi-detached, while the total surface of the detached/semidetached areas doubles that of the row houses. Average plot is 425 m2, with detached plot average of 585 m2 and row houses of 295 m2. The layout of the new developments is based on the traditional blocks formed by crossroads and tangential roads and a few slightly more distant rectangular forms. None of these new developments provide relevant new public spaces or facilities.

The new developments studied at Argés, change the historic morphology and are more predominantly row houses (53% row houses, el 31% detached and 16% demi-detached), while the total surface of detached areas is two and a half times that of row houses and four times that of semi-detached ones. New developments include a relevant percentage of small apartment buildings (25% of total dwellings). The percentage of row houses and apartments are a sign that developers have played a major role, while in other cases their role finishes in selling the plots. The average plot is 464 m2, with 787 m2 for detached ones, 388 m2 for semi-detached and 299 m2 for row houses. The final layout is again based in the existing roads but with so many additions that a new order prevails.

New developments disconnected from the traditional built-up fabric don't rely on traditional urban or rural settlements, but on other territorial elements, such as roads or natural areas, and produce new mono-functional residential and spatially isolated developments. We called them "disconnected" instead of isolated, because, over and above being spatially separated from traditional settlements, they are also socially and economically different from these settlements, and composed of specific socio-economic groups, and less varied from those living at the traditional settlements, and in many cases wanting to be separated from them (see Figure 4).

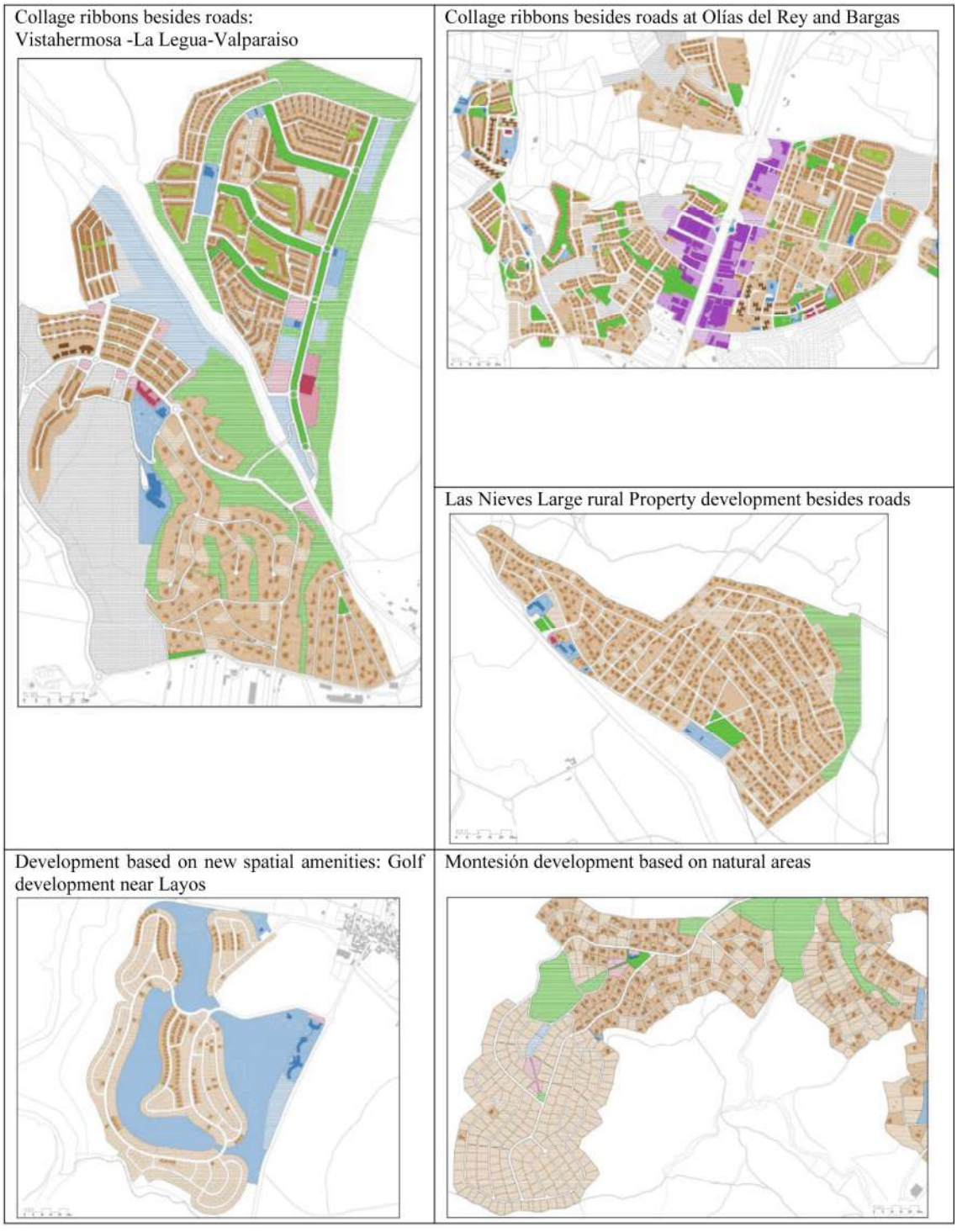
They are spatially bigger developments than the previous ones, due to the land property they are located at and to reach a certain size which allows for survival (i.e. their own school). Their location and characteristics try to improve their attraction capacity and economic value. They were often built as gated communities and in some cases they are now open, having transferred the property of roads and green areas to municipalities.

They are predominantly composed by big detached houses and plots, often above 1000 m2 (between 548 and 4.755 m2) and have high prices (between 1.213 and 1.638 €/built m2), just slightly below areas within dense built areas and above those besides historic small settlements. Reversely, most of them dedicate very little land surface to the street network (the land is for big private plots).

Four subtypes have been found. First, *Collage ribbon developments besides roads,* which are located north of Toledo, where small size developments (between 6 and 50 Has) started late 1960's and later on other small ones were added besides them, resulting in several big size (between 190 and 250 Has) collage developments. Two cases are studied: a combination of three developments north-west of Toledo municipality, Vistahermosa, La Legua and Valparaíso, and several adjacent developments at the closest to Toledo parts of the Bargas and Olias del Rey municipalities. The prices are always higher than those besides the villages and smaller than those inside the Toledo dense built-up area. Both of them are a mixture of detached, row houses and even low rise apartment buildings, with several layout patterns, combining earlier and later prototypical ones, and progressively adding denser detached/semi-detached houses, occasionally with very small private gardens and some bigger community/private ones. Exceptionally they include some industrial uses.

Second, *Large rural Properties developments besides roads* take place only south of Toledo and their perimeters are irregular/irrational, coinciding with the previous rural land

Figure 4. Developments disconnected from the traditional built-up fabric



property and also tend to be as close to Toledo as possible but in other municipalities. One has been studied at the north-west end of the Nambroca municipality called "Las Nieves". It is a 103 Has development of detached houses over big plots (average of 1.295 m2). Its layout efficiently subdivides the land into blocks and plots and it has provided almost no structure, small streets, green areas at edges, not thought for being used but just to fulfil the legal requirements, and small public/community facilities besides its two entrances.

Third, *Developments based on natural areas and wildlife habitats* happen in isolated locations but near the main city and where they "privatise" interesting natural areas. Their main concern is the division into big lots with no relevant urban structure or public facilities. The case of Montesión (an expansion of the traditional second homes-agricultural Cigarrales area (Cruz, Español, et al., 2006)) is studied, composed only of detached buildings, very big plot average size (3.398 m2), and only 9,7% of its total surface dedicated to streets.

Forth, *Developments based on the creation of new spatial amenities* are relevant at urban areas and also at touristic ones, in many cases are gated communities, to control de access to the residential area and the new created amenities, and their urban structure is strongly linked to the new amenities. Location of developments based on natural/wildlife areas are limited and normally expensive, while those based on new spatial amenities can be created in many more cheap places. The 154 Has Golf development near Layos dedicates 43% to a golf course and other sports amenities (67,7 Has) and all plots are of intermediate-big size (904 m2) facing the golf course.

Conclusions

The study of single-family habitats at Toledo, as representative of small Spanish cities at intermediate distances from and influenced by metropolises, leads to the four following conclusions.

Territorial occupation/location. The single-family production process changes by the 1970's. Previously they were generated besides major factories or by the adjacent suburban areas, representing two very different morphologies. One (industrial based new villages) cultured and with public facilities, the second only interested in producing cheap suburban housing. Since the 1980's its diversity and relevance increases and the road network, the rural land property, the privileged natural areas and the proximity to Toledo (no more than 5-10 km) become crucial.

Social segregation. Single-family habitats are designed to facilitate or as a consequence of social segregation. Detached big plots areas or gated communities with their facilities are reserved for high classes, while small plots row houses are open to middle and mixed classes.

Functions. Single-family habitats show two double extremes. Those developments that provide facilities and urban structure, and those mainly interested in an efficient land subdivision. Both of them take place both for high and low classes (prices). The second dichotomy results from monofunctionism, except for one case which includes a small part with industrial uses (collage developments south of Olías and Bargas), all other have only residential uses (and their related public facilities).

Varied urban morphology. Single-family habitats don't have a uniform morphology; on the contrary, as a result of the relation between private and public land, the location, form and private/public character of the public facilities and green zones, the type of lots and streets, the relation to the territorial elements and the production procedure, several morphologies can be observed. Public facilities, green zones and street network are key elements of their urban morphology, with a few exceptions, while land subdivision is much more so. In many cases, public areas are a requirement but without main references, diluted and without identity, due to the requirement of single-family blocks and their territorial location. The exceptions being the Industrial based villages and those based on the creation of new amenities. Nevertheless, their rationale differs, with the first ones trying to generate an interesting and cultured urban area, the second ones are totally conditioned by the requirements of the new amenity and the control of access. In most disconnected cases, plots are an expression of nature privatization, and thus public green areas as a way to publicly use nature is not demanded by inhabitants and thus becomes a marginal element.

The main contribution of this paper is the classification proposal of single-family habitats by small Spanish cities since the 1950's. In summary, the main characteristics of each type are as follows:

- Industrial based habitats are characterised by their cultured structure, their small plot and street size and their amount of public facilities. These developments ap pear early (even before the study period) and are soon discontinued.
- Small zones inside dense urban areas have two different characteristics and periods. Earlier ones are self-built, lack almost everything and at present are intensely redeveloped. Recent ones have edge type layouts and the legal required facilities and green zones, with design being more relevant than in most other recent types.
- The addition of Incremental expansions adjacent to villages, depending on their comparative surface relevance, may or may not change the traditional overall village morphology.
- Disconnected developments are the most peculiar are based on the privatization of nature and the production of new amenities. Four sub-types have been distinguished based on their production procedure and attraction factors. Each sub-type present different urban structures.

References

Billard, G., Chevalier, J. and Madoré, F. (2005). *Ville fermée, ville surveillée* (Presses Universitaires de Rennes, Rennes).
Brandis, D. (2008) La expansión de la ciudad en el siglo XX. In A. Fernández García (dir.). *Madrid. De la Prehistoria a la Comunidad Autónoma* (Consejería de Cultura de la Comunidad de Madrid. Madrid) 519-539.
Campos, M.L. and Rodriguez, M.A. (2008) El poblado obrero. Vestigios de un Urbanismo Socio Industrial en el Toledo actual. en *Ciudades, culturas y fronteras en un mundo en cambio*. IX Coloquio y Jornadas de Campo de Geografía Urbana (Grupo de Geografía Urbana de la Asociación de Geógrafos Españoles. Sevilla).
Cruz, L., Español, I., Muñoz, E., et.al. (2006): "Los Cigarrales de Toledo: idealización y deterioro de un paisaje cultural". *Cuadernos de Ingeniería y Territorio* 8, UCLM.
De Pablos, J.C. y Susino, J. (2010) "Vida Urbana: entre la desigualdad social y los espacios del habitar", *Anduli* 9, 119-142.
Díaz, M.A. and Rodriguez, J.M. (1989): "Spatial variations of female and male labour force participation in the Madrid Metropolitan Area". *Space, Populations, Societies* 1, 43-52.
Díaz, M.A., Rodríguez, J.M. and García Palomares, J.C. (2006) "Desplazamientos laborales y género en la Comunidad de Madrid a partir del censo de población 2001", *X Congreso de Geografía de la Población, AGE*.
Fedrani, J.C. (2009) Las nuevas periferias en el proceso de expansión urbana. El caso del partido de La Plata, *Geograficando* 5, 103-125.
García Palomares, J.C. and Gutierrez Puebla, J. (2007): "La ciudad dispersa: cambios recientes en los espacios residenciales de la Comunidad de Madrid", *Anales de Geografía*, XXVII, 1, 45-67.
Gómez Mendoza, J. (2007): "La ocupación del suelo". *Atlas Estadístico de las Áreas. Urbanas de España 2006*. (Ministerio de la Vivienda, Madrid).
Leal, J. and Cortés, L. (1995) *La vivienda en Madrid.* (Comunidad de Madrid, Madrid).
López de Lucio, R. (1998): "La incipiente configuración de una región urbana dispersa. El caso de la Comunidad Autónoma de Madrid, 1960-1993", In: MONCLUS, F.J. (ed.). *La ciudad dispersa, suburbanización y nuevas periferias*. (CCCB, Barcelona)169-196.
López de Lucio, R. (2004): "Morfología y características de las nuevas periferias. Nueve paisajes residenciales en la región urbana de Madrid". *Urban* 9, 56-80.
Módenes, J. A. (2006): "Movilidad espacial: uso temporal del territorio y poblaciones vinculadas", *X Congreso de la Población Española: Migraciones, movilidad y territorio*. Pamplona.
Monclús, F.J.ed. (1998) *La Ciudad Dispersa*, (Centro de Cultura Contemporánea de Barcelona).
Naredo, J.M. (2010): *Raíces económicas del deterioro ecológico y social. Más allá de los dogmas.* (Siglo XXI, Madrid).
Pereira, S. (2006) *A cidade fragmentada: multiplicação da centralidade e das desigualdades socioespaciais em Presidente Prudente*, (Presidente Prudente, UNESP)
Pujades, I. (2009): "Movilidad residencial y expansión urbana en la Región Metropolitana residencial y expansión urbana en la Región Metropolitana de Barcelona, 1982-2005". *Scripta Nova* XIII, 290
Serrano, R., Ureña, J.M., Pillet, F. and Coronado, J.M. (2004) *Renovación y expansión urbana en Ciudad Real*, Cuadernos de Ingeniería y Territorio 3, UCLM.
Solá-Morales, M. (1997) *Las Formas de Crecimiento Urbano*, (Universidad Politecnica de Catalunya. (first edited in 1971)).
Sposito, M.E.B. (2009) Nouveaux habitats urbains dans des villes moyennes paulistes – Brésil », *Espaces et sociétés* 136-137, 173-188.
Susino, J. (2001): "Movilidad residencial y movilidad cotidiana en áreas urbanas", en Castañer, M. et alia (eds.), *Áreas urbanas y movilidad en España*, Universitat de Girona. Girona 141-163.
Susino, J. (2007): "Las clases medias en la movilidad residencial metropolitana", en FERIA,

J.M. (ed.): *La vivienda en los espacios metropolitanos.* (Centro de Estudios Andaluces. Sevilla).
Susino, J., Casado, J. M. and Feria J. M., (2007): "Transformaciones sociales y territoriales en el incremento de la movilidad por razón de trabajo", *Cuadernos de Geografía,* 81/82, 71–92.
Troitiño, M.A., (2007): "Áreas urbanas" en *Atlas estadístico de las áreas urbanas en España.* (Ministerio de Vivienda).
Ureña, J.M.de, Solís, E., Ruiz-Apilánez, B. and Mohino, I. (2012) *El hábitat unifamiliar en ciudades históricas de regiones metropolitanas policéntricas: El caso de Toledo*, Cuadernos de Ingeniería Arquitectura y Territorio, 13, UCLM.
Vicuña, M. (2012) The Forms of Residential Density in the Contemporary City. The case of Santiago, Chile, *Proceedings: Eighth International Space Syntax Symposium.*
Vilagrasa, J. (1998) The study of urban form in Spain, *Urban Morphology*, 2 (1), 35-44

Evolutionary design for BiOrganic Architecture

Alessandra Capanna
Facoltà di Architettura, Sapienza Università di Roma, Italy
Keywords: Shape generation, pattern-language, urban growth, algorithmic design

Abstract

A new design philosophy is based on the contemporary condition that allows architects to manage complex-systems science as a tool for the development of the project. Conventional analytical - reductionist - methodology is supported and sometime substituted by non-linear processes, including computer aided software. Generative methods for urban design are able to propose solutions to complex building settlements through the use of self-generated computerized programs; in terms of possibility, the use of the computer as a thinking support, let the designer's community achieve natural system employing artificial intelligence. The potentiality of this methodology is that of creating a city that will be as natural as a spontaneously generated as a living organism. The paper illustrates a tendentious point of view putting in continuity the "natural" growth of ancient cities and projects for new neighborhood made up with the support of generative methods. Makoto Sei Watanabe's Induction Cities project is based on the main concept that cities as living organisms have to be planned using tools supporting this BiOrganic innate characteristic. The purpose is to discover ways of making cities and architecture that provide better solutions to problems at the same time offering greater freedom to the imagination. A test case for Induction design methodology in a selected suburban area of Rome is foreseen.

Introduction. Organic is rational

Architecture is not just a figurative art, and this is more easily understood when we look at the processes of generation of cities: even when built cities seem to be spontaneous and unplanned, they highlight evolutionary and "natural" processes due to the will and the case.

According to Christopher Alexander, the renowned father of the Pattern Language theory, the organic unity of Venice, Amsterdam (Alexander 1965, 1987) and of almost all the cities of the past is appreciated because ancient cities didn't follow any abstract ordered drawing.

Apart from those cities designed starting from a precise geometrical figure in plan, as in the city of Palmanova, the fortress-city built at the end of the 16th century in the Republic of Venice with the form of a nine-pointed star, or other famous Italian cities founded, above all, during the Renaissance, or else those squared new towns typical of the New World, most part of these cities are seemingly spontaneously generated just like biological organisms, self-organized according to physical conditions, supporting the particular orography, and determining the shape of the blocks and of the buildings upon geographical settings and climatic necessities or similar natural aspects. What makes - for example - Palmanova different from the squared new towns, even if geometrically set in an abstract figure, is an increased degree of complexity of the geometry. In fact the complexity is exactly the characteristics of almost all the living organisms.

Thus, "natural growth" is unique and not recognizable in any other biological or physical structure and nevertheless obey some Rule of Nature. The substance (and fortune) of Mandelbrot's fractal curves is all – in fact – in its capacity of describing any kind of complexity, even if it is a process that indicates more the analogy and the impressive resemblance of mathematics to very well-known images, than the opposite possibility to "mathematize" something. That is: it is easy to rich a form from a formula. Not a formula from a form.

In the same way, urban growth seems to be something evolving (in a Darwin-way) rather than developing, so demonstrating the deep essence of the city as a living organism.

In 1986 Celestino Soddu, pioneer of the generative design in Italy, designed a software for creating 3D models of endless variations of typical Italian Medieval towns. He describes Generative Design as a morphogenetic process using algorithms structured as not-linear systems for endless unique and un-repeatable results performed by an idea-code, as in Nature (Soddu 1992).

And, because the city is a living organism, growing and developing over time, on several occasions, Luigi Piccinato, - the Italian Town Planner, co-founder with Bruno Zevi of the ApAO (Associazione per l'Architettura Organica) - had stated that the concept of organic contains that of rationality, but in a more complex way, and that the organic culture is particularly suitable for urban planning (Astengo 1988).

The idea of learning from Nature, observing and imitating it, is frequent and recurrent in Architecture: beginning from the growth of the trees, to the metaphor of the bee hives manufacturers, to the golden mean that we can find almost everywhere, as well as the self-similarity of fractal geometry, up to chaotic system analogies, nature and artifice coincides in the spontaneous or pre-organized creative processes.

Christopher Alexander, in his four-volume *The Nature of Order* made an effort to incorporate life-evoking geometry and step-by-step construction into a design process orientated towards sustainable principle of urban growth. His Pattern Language (Alexander 1977) is a method of describing good design practices, pinpointed according to a description of the problems and of the related items like settlements, buildings, rooms, windows, latches, etc., classified and then explained it to local population so that they could design among themselves their own houses, streets and communities. The method leads to a kind of "do-it-yourself-generation" of urban design that could be compared to the computer-aided automated process method - selecting and organizing amongst prime archived elements - which is the basis of Artificial Intelligence, applied to any compositional activity (Capanna 2006, 2015).

It is no coincidence that Alexander' book Notes on the Synthesis of Form, analyzing

the design process in itself, influenced the development of the theories of those who believed that there is not any conflict between the aesthetical creation of forms and the use of computer software to generate them.

This idea of making available a method and a list of solutions open to everyone comes from the author's observation that most of the wonderful places of the world were not made by architects but by craftsmen. The iterative process which he proposed to select the right configuration (formalized in 1977 in the voluminous book A Pattern Language: Towns, Buildings, Construction) had a huge success, as a matter of fact constituting the forefather of most of the computer programs working on auto-generative structures, integrated by selective processes.

Nevertheless, Alexander himself admitted the failure of pattern language to produce buildings (and consequently cities) of certain beauty, so an in-depth analysis of those fundamental properties which he defined "qualities without names" became the topic of a kind of phenomenology of wholeness, again driving the solution of aesthetical questions into the field of mathematics. In fact, the old, intuitive method of design seems to be no longer sufficient for contemporary design.

As a consequence and thanks to the advancement of human knowledge, fueled by the development of cybernetics and computer software, some research on new urban design has also focused on *organized complexity projects*, putting together organicity and rationality, because organic is rational, as we can find in every living organism its mathematical structure. Moreover, who is familiar with mathematical and logical symbolic knows that Fuzzy Set theoretical approach to numerous problems of applied mathematics and, especially, fuzzy logical analysis of those problems, become frequent in the modern mathematical modeling of the real world.

Mathematical structures as the seed of generative methods for urban design.

A City is not a Tree (Alexander 1965), to quote the title of a short essay published in *Architectural Forum* just fifty years ago. Or is it?

If we follow the metaphor of cities as living organisms and of the natural growth of forms, a city is a tree, a leaf, a flower, a shell and so on, thanks to its organic nature. On the contrary, from the mathematical point of view, it could be a tree or a semi-lattice depending on the complexity of the relationships among the parts.

Showing the differences between old and new towns, Alexander highlights the related mathematical structures applying the Set Theory to different urban systems.

Simplex urban structures, without overlapping of systems, are trees (not in the green sense of the term, but following the graphic representation of intersections among connections); whereas, those structures characterized by an increasing complexity, with numerous parts (areas and crossroads) in common, overlapping, are semi-lattices. A semi-lattice is a partially ordered set, with important mathematical properties, and relevant applications in fuzzy set theory.

The search for analogies and similarities in Art and Science, to make a parallel between "organic growth" in Nature and the "organic growth" in Architectural construction, dates back at least to the first half of XX Century. Cornerstones were the work by Sir d'Arcy Thompson (Thompson 1917), as well as the later investigations of Matyla Ghyka, who developed a whole theory where the notions of "Mathematics of Art" and Mathematics of Life" are (to use his words) *coincident […] under a condensed form that we can call «The Geometry of Art & Life»* (Ghyka 1977, Introduction).

The paradigm is to consider the design process as a result of organic growth. The evolution of information technology and, above all, the studies on AI (artificial intelligence) support the efforts to apply the computer science to architecture.

Shape generation is based on issues of regularity and/or irregularities and it concerns the locking on and the enforcements of laws, principles, rules and exceptions. It is also based on the correspondence between ideal forms constituting visual imagery and geometries. Finally it is based on the observation that our universe is not "simple" but rather formed by simpler fragments from which "order emerges from chaos" (Érdy 2007). So, the

aim of the research on generative methods to urban design is to overcome the imitation of the growth in itself, constructing not only forms that are natural or looks like natural, but even trying to work as Nature would work.

Trees and grids, set and systems, simplicity and complexity, linear and non-linear, patterns (bi-dimensional) and spatial (three-or-even-four-dimensional) organizations of cities or parts of them, are all ordered mathematical structures with different level of complexity.

So, what do we mean by "regularity" or "chaos" in the developing of urban form?

In Search of a "Free Order"

Almost everyone knows, at least at intuition level, what is an ordered event and what is a chaotic event. The simplest way to describe it is to define, following an instinctive geometrical approach, the physical position of objects or their parts. This is because Geometry, as a whole of relations between positions, quantities and qualities, has essentially to do with human acts, mainly performed according to organized schemes, oriented in Space and in Time.

Some elementary form of Order seems therefore to be always present, even if it easy to consider chaotic, for instance, the growth of a town, modern life, traffic, brute conglomerations of uncoordinated forces. When observing such events, considerations of perceptive and subjective character emerge and lead into the field of Gestalt Psychology (Wertheimer 1944). It informs us that Chaos cannot be seen until one looks at reality "from below", as being formed by fragments whose reciprocal relations often stop at relations with neighbors, in a short-sighted perspective, unable to govern as a whole the complexity of sets that can be unlimited or so large to be easily considered as with no frontiers. From such a viewpoint also Order will remain hidden. It is therefore necessary to work at a distance and look at structure from far away; an operation that allows to recognize schemes and rhythms, measures and reciprocal relations that, according to Rudolph Arnheim (Arnheim 1977) unavoidably determine "order relations".

In his short essay entitled *Entropy and Art. An Essay on Disorder and Order*, Rudolf Arnheim claims:

Order is a necessary condition for anything the human mind is to understand. Arrangements such as the layout of a city or building, a set of tools, a display of merchandise, the verbal exposition of facts or ideas, or a painting or piece of music are called orderly when an observer or listener can grasp their overall structure and the ramification of the structure in some detail. Order makes it possible to focus on what is alike and what is different, what belongs together and what is segregated. When nothing superfluous is included and nothing indispensable left out, one can understand the interrelation of the whole and its parts, as well as the hierarchic scale of importance and power by which some structural features are dominant, others subordinate.(Arnheim 1971, abstract)

In the same way some theorists of "esthetics of information" declare that Art (as such, Architecture) is located at the intersection point between Order and Disorder.

New urban settlements are generally characterized by the use of a (ordered) module as a technique and as a method. These are some of the major distinctive features of Le Corbusier's approach to the conquer of Order, that can be obtained by adopting suitable "regulatory paths": "*Un tracé régulateur est une assurance contre l'arbitraire: est une satisfaction d'ordre spirituel qui conduit à la recherche de rapports ingénieux et de rapports harmonieux. Il confère à l'œuvre l'eurythmie. Le tracé régulateur apporte cette mathématique sensible donnant la perception bienfaisante de l'ordre*" (Le Corbusier 1923, p. 53).

The aim of my research is to introduce the possibility of enucleating a logical form lying at the basis of the geometrical structure of the composition, in its transformations, in its discontinuities, in all the interruptions, in all passages, in the borders of a rule, in the force of propagation and in the ability of coexistence and superposition with reference figures that case by case are selected by the planner as those that are able to better interpret the "genius loci". Additionally, to analyze the application of self-generative software programmed for urban design as a tool for setting a *free-ordered* plan.

Even if streets are usually made to run straight, people take more pleasure to walk

in a medieval labyrinthine town. The figurative analogy with fluid circulation (sap of the leaves, lung tissue and capillaries in general) is so plain, and also its fractal nature, that compares our inner structure and the surrounding environment.

To synthetize:

- should Chaos theory explain the development of urban settlement?
- can we recognize a sort of entropic process observing the urban growth?

Entropy, as a generic explanation of "casual rules" in everyday's life, is part of our usual language. People with limited scientific knowledge easily understand the physical reasons of events that are related with daily problems. It makes also part of "common experience" the understanding that several phenomena, maybe most of them, happen exclusively and in an irreversible way because of a process that tends to pass from Order to Chaos.

- but, does the design process proceed from order to chaos or, vice versa, as designers, do we tend to organize our projects as ordering elements, proceeding towards a new order out of disorder?
- and, above all, can a computer manage regularity and irregularity with the aim of achieving better solutions for town design?

Another observation derives from analyzing the different levels of entropy. When this quantity has not yet attained a maximum (that we can imagine as corresponding to a static, homogeneous and totally chaotic configuration, that can be reached only after a reasonably long time has elapsed) we can still realize the existence of "complex regularities" that are produced by the transformation law. As is well known, in fact, the term "entropy" (from Greek en, i.e. "inside", and trope, i.e. "evolution") means "internal change". Accordingly, the above situation does not determine an effective degree of disorder, but rather the ensuing of "different internal configurations", something that Ludwig Boltzmann called "complexions", just to make clear the existence of a microscopic dynamics underlying the macroscopic dynamics in equilibrium. Such changes have therefore an evolutionary character and obviously describe in an almost perfect way those that happen in Nature but also, according to my tendentious point of view, in the "spontaneous" growth of towns, that is usually characterized by a regulating layout that (with notable exceptions) is unintentional rather than fully programmed.

Generative methods

The main purpose of generative software for architecture is not to discover forms, but to settle ways of making cities, neighborhoods or buildings and to provide better solutions for people and their wellbeing. It also offers tools for visualizing concepts and creating projects as if they were spontaneously generated. This is not enough, of course, because people (and designers) need to associate to the precision of the method a certain amount of aesthetical qualities.

Far from attempting to historicize the creative act of composition and the research on generative software as well, it could be useful to quote Michael W. Mehaffy's paper "Generative method in urban design: a progress assessment" (Mehaffy 2008). The paper describes the upgrading phases of generative methods as ancestors of a new urbanism for our present world, after the Modernism; it illustrates a kind of return to the origins and to the utopia of ideal cities, garden cities and painstaking basic plan drawing schemes - or standardized template - for urban designers, developed within the New Urbanism. The point is, according to Mehaffy, that the city cannot be a work of art - that is exactly what he consider the effect of the implementation of the advancement of computer science for architecture - and that, on the contrary, it could be advantageous a transition of modern information technology in a more adaptive organic direction.

On the contrary, in 1994 Makoto Sei Watanabe developed the Induction Cities program, essentially founded on two topics: visualizing concepts and providing a method.

Watanabe's approach tends to be similar to the principles of the biosystems more and more of which is being understood through research on artificial life. However, living organisms are not governed by a smart designer, so, what guarantees its self-organiza-

tion? The answers, although in terms of possibility, allow designers to use the computer as a thinking support and let the designer's community achieve natural system employing artificial intelligence.

The idea is not, of course, to automate design; the aim is to achieve higher quality by selecting among a large number of possible solutions using computers as an extension of the brain.

Forming process according to Makoto Sei Watanabe's Induction Cities

Makoto Sei Watanabe began the "Induction Cities" project stating that a city cannot be designed, an opinion that is not in contradiction with that of Alexander's about the fact that common people are (by nature) better than designers in knowing what the city needs to offer; so in 1994 Makoto Sei Watanabe developed a Program Aided Design, capable of proposing solutions to complex building settlements through the use of self-generated computerized programs. The potentiality of this methodology is that of creating a city that will be as natural as a living organism.

The first that has been built in Japan is Atlas (1995). It is a multi-unit housing complex based on the same concept generalized for the "induction cities" project, which basically underlines that the facts create a city.

Atlas is intended to be a collection of variation on the theme of the house that could fit all the possible needs in terms of dimension and facilities required. Watanabe prepared 16 different types of plans for the 20 dwellings to be built on the selected site, and combined them as individually unique volumes.

Computer combines units at random and sends sunlight to each, for instance, in the experimented case-study of Sun-God City. In Atlas, it combines as well the different housing types, providing the unit program called *Generated City Block* with a tool that generates street patterns efficient but avoiding monotonous grids. This process is repeated automatically until all the units are arranged. Of course this method can be applied to generate settlements fulfilling other important conditions such as privacy, accessibility, and other fuzzy criteria concerning the human wellbeing. "Feeling good", in fact is difficult to include in a common set of rules of required objective conditions, essentially because the concept is vague and above all it cannot be unified. What Nature teaches to us is that diversity is the "right answer". (Makoto Sei Watanabe 1998, 2002).

Conclusion. Selected case-studies to test the method

As the purpose of the use of generative software for architecture is not to discover forms, but to discover ways of making cities and buildings that provide better solution to problems, while at the same time offering a support to new frontiers of the imagination, it could be interesting to test the method in selected case-studies of regeneration of peripheries and of historical neighborhoods. The need to re-establish the relationship between man and nature should not only operate as an attempt to mitigate - through eco-friendly technologies, energy efficiency, use of recyclable materials - the negative human effects on the environment, but also encourage a radical cultural change with a new methodology. Instead of selecting patterns and organizing grids and geometries, or falling back on wistful ancient-style solutions, generative results rise from answering to the unquantifiable need of good and beauty that could not only correspond to what is right.

In particular for the regeneration of the historical Roman suburbs we can think about two different types of cases-studies:

1. Outdoor spaces related to post-war suburbs.
   Generative software can be programmed to satisfy fuzzy criteria such as: vegetation suitable for cooling the common open space, nice view from the inside of the houses, suitable areas for young and for old people, balance between paved areas and areas for rainwater harvesting, grey areas not too thick, etc..
2. Demolition and reconstruction of parts of the city in bad social and urban condition.
   Starting from the famous demolition of Minoru Iamasaki's Pruit-Igoe (city of Saint-Louis,

Missouri), to Chicago Cabrini Gardens, up to the recent idea to substitute the whole ro man settlement of Tor Bella Monaca with a New Urbanism project by Leon Krier, my tendentious point of view is that it could be interesting to test Makoto Sei Watanabe's method and the studies on Generative design, as the seed of what could be called BiOrganic @rchitecture (Makoto Sei Watanabe http://www.makoto-architect.com/books/book_yawara2_e.html), to the previous cases-studies(Tor Bella Monaca at first), programming the generation of a new urban form with fuzzy criteria to attain urban life style in sustainable, convenient and enjoyable places, without nostalgic style of past recoveries.
The research is in progress.

References

Alexander, C. (1965) *A City is Not a Tree, Architectural Forum*, vol. 122, pp. No. 1. re-print in: *Design After Modernism*, Edited by John Thackara, Thames and Hudson, London, 1988 pp. 67-84. Available at: <http://www.rudi.net/bookshelf/classics/city/alexander/alexander1.shtml>
Alexander, C. (1977) *A Pattern Language: Towns, Buildings, Construction*, (Oxford University Press, USA) 1216.
Alexander, C., Anninou, A., Neis, H. (1987) *A New Theory of Urban Design*, (Oxford University Press, USA).
Alexander, C. (2001) *The Nature of Order Book 1: The Phenomenon of Life*, (2003) *Book 2: The Process of Creating Life,* (2003) *Book 4: The Luminous Ground,* (2004) *Book 3: A Vision of a Living World*, Center for Environmental Structure, Berkley USA; and http://www.natureoforder.com/
Arnheim, R.(1971) *Entropy and Art. An Essay on Disorder and Order*, University Of California Press, Berkeley. Adapted from the web version available at http://acnet.pratt.edu/˜arch543p/readings/Arnheim.html, Aug. 2001
Arnheim, R. (1977) *The Dynamics of Architectural Form.* The Regents of the University of California, Berkeley and Los Angeles; (italian version 1985) *La dinamica della forma architettonica,* Milano - cap. 6, "Ordine e disordine".
Astengo, G. (1988) a cura, *Luigi Piccinato. La Progettazione Urbanistica. La città come organismo* (Marsilio, Venezia).
Capanna, A. (2006) *BiOrganic Design. A New Method for Architecture and the City,* in *Nexus* VI: *Architecture and Mathematics.* Genova, 7-9 June, Kim Williams Books, p. 11-20, re-print (2015) in *Architecture and Mathematics from Antiquity to the Future: Volume II: The 1500s to the Future*, ed. Williams, K., Ostwald, M.J. (Birkhäuser Basel/Springer International Publishing Switzerland) 579-591.
Érdy, P. (2007) *Complexity Explained (Springer Complexity)* (Springer Verlag Heidelberg, Germany).
Girard, C. (2007) *Makoto Sei Watanabe* (Edilstampa, Roma).
Le Corbusier (1923) *Vers une Architecture*, Paris, "Les Tracés Régulateurs".
Matila Ghyka (1977) *The Geometry of Art and Life*, Dover New York, – based on the first edition: New York 1946.
Mehaffy, M. W. (2008) *Generative methods in urban design: a progress assessment, in Journal of Urbanism: International Research on Placemaking and Urban Sustainability,* 57-75.
Soddu, C. (1989) *Città Aleatorie* (Masson Publisher).
Soddu, C., Colabella, E. (1992) *Il progetto ambientale di morfogenesi. I codici genetici dell'artificiale* (Progetto Leonardo ed.).
Soddu, C. (2004) *Generative Design / Visionary Variations - Morphogenetic processes for Complex Future Identities, in: Organic Aesthetics and generative methods in Architectural design* edited by P. Van Looke & Y. Joye in Communication&Cognition, Vol 36, Number 3/4, Ghent, Belgium.
Soddu, C. <http://www.generativedesign.com/> <http://www.celestinosoddu.com/>
Thompson, D'A.W. (1917) *On Growth and Form*, Cambridge.

Tru Hoang Cao (2010) *Conceptual Graphs and Fuzzy Logic: A Fusion for Representing and Reasoning* (Springer Verlag Heidelberg, Germany).
Watanabe, M.S. (1998) *Makoto Sei Watanabe. Conceiving the City* (l'Arca Edizioni).
Watanabe, M.S. (2002) *Induction Design* Birkhäuser (Switzerland/Germany) http://www.makoto-architect.com/idc2000/index2.htm
Wertheimer, M. (1944) *Gestalt Theory*, in: "Social Research", febbraio 1944

Slow City Movement as a New Approach in Urban Conservation: Case of Seferihisar, Turkey

Deniz Yilmaz, Müjgan Karatosun
Faculty of Architecture, Izmir University, Turkey
Faculty of Architecture, Izmir Dokuz Eylül University, Turkey
Keywords: globalisation, urban conservation, Slow City, Seferihisar

Abstract

The industrialization period that occurred in the 19th century is an important milestone in terms of cultural, economic, social and environmental factors for the cities that are constantly in change. During the 20th century, the reflection of globalization on cities has arisen the formation of consumption focused, uniformificated and unidentified spaces. As a reaction to this case, urban development policies have began to gain a different point of view and urban tendencies focused on conservation have emerged. One of these tendencies which were developed especially in the 20th century is the "slow movement". The slow movement initially emerged against fast food and fast life. Afterwards, the movement has become active in the urban context with the establishment of Slow City Movement (Cittaslow) in Italy in 1999 and has become internationally widespread. Fundamentally, Slow City Movement aims to improve the life quality of the cities by conserving the intangible and tangible local values that are under threat of disappearing through globalization.

Especially from 1980s, the globalization as a worldwide phenomenon has affected most of Turkish settlements with various sizes. The local values of these settlements were affected negatively. The purpose of this study, is to examine the impacts of the movement on the urban conservation as a new tendency. Within this context, Seferihisar, a city located in the west of Turkey, which have a multilayered historical urban texture and a rich cultural and natural heritage will be evaluated. Seferihisar is the first city in Turkey that has a membership of Slow City international municipal network. Through this study, the projects based on the conservation of the cultural heritage will be analysed in the context of Slow City movement. In this way, the effects of the Slow City movement on the conservation of the cultural heritage of a city will be determined and will bring forward some alternative proposals directed to sustain local values.

Globalisation is an important milestone for the urban areas that are constantly in change. During the 20th century, the reflection of globalisation on cities has arisen with the formation of consumption focused and unidentified spaces. As a reaction, urban development policies have began to gain a different point of view. Urban tendencies have begun to focus on protection. At the end of 20th century, the concept of urban conservation has been a particular concern of cultural heritage.

One of new conservation approaches is "slow movement". The slow movement initially emerged against fast lifestyle. Afterwards the movement has become active in the urban context and has become internationally widespread. Fundamentally, Slow City Movement aims to improve the life quality of the cities by conserving local values that are under threat of disappearing through globalisation.

Slow city movement will be mentioned as a new urban conservation approach. Within this context, a city located in the west of Turkey named Seferihisar, which have a multilayered and a rich historical, cultural and natural heritage will be evaluated. Through this study, cultural heritage conservation based projects of a city will be analysed in the context of Slow City movement. In this way, the effects of Slow City movement to the conservation tangible and intangible cultural heritage of a city will be determined.

Concept of Globalisation and its Effects on Cities

City is a multi-dimensional content. With this structure, city has gone through many phases which have been caused continuous changes to reach the conception of 20th century cities. The effects occurred in 20th century cities; realised both in functional and dimensional aspects; have been evaluated as the concept of globalisation for a while.

According to Robertson, globalisation is the integration of all societies and it is both a retrospective and modern concept. The retrospective aspect of globalisation goes back to the concept of religion that aims to spread thoughts and unite humankind. On the other hand, the modern aspect of globalisation can be defined as building of worldwide social relations as a result of the development on transport and communication technologies beginning with 19th century (Robertson, 1992). Globalisation of modern period is the worldwide spreading of fast production with the capitalist system, domination of multinational corporations and rise of informative-technologic-innovative concepts (Ergun, Günes and Ergun, 2013).

In modern terms, globalisation had initially been evaluated economically in 1960's. In 1980's, there were signs of positive and negative approaches on impacts of globalisation on social, culture and urban structure. As a social impact, Bauman has mentioned that although capital and goods are free of borders globally, human is condemned to local life. According to him, localisation makes societies unworthy and creates "new world disorder" (Bauman, 1997). Robertson; who consider the concept of globalisation as a cultural matter; has mentioned that, globalisation gives strength to world consciousness and communication among societies. This requires spreading of cultural components and revival of local cultures by producing in world scale (Robertson, 1992; Giddens 1997). On the other hand, due to Robertson; although globalisation is making the world smaller, societies do not have a tendency to create a holistic cultural approach (Robertson, 1992). The impacts of globalisation on urban stucture have began with the urban planning attitude of governances which are focused on international political strategies and have ruled out local development necessities. Local values that became insignificant, has given way to an inauthentic cultural identity. As Kiper mentioned, the most visible effects of the changes in local values and social structures can be observed in cities (Kiper, 2004).

Turkey is a country that is wide open to the effects of globalisation due to its geostrategic location and multicultural structure. Especially from 1980's, globalisation had impressed culture, social life and urbanisation of Turkey in consequence of the efforts to create relations with global economy and to follow a development strategy based on encouraging foreign investments. As Sipahi mentioned, these efforts in economy,

created a new class in society that adopted consumption based culture (Sipahi, 2011). Besides, inbalanced and unrighteous development in economy caused a deep polarisation in the society. This cultural and social structure has caused urban sprawl and has created "urban wreckage areas" (Tekeli, 2014). Urban policy has focused on rental urban transformation. Thus, has given rise to rebuilt urban spaces with an inauthentic nonlocal identity that is one of the most important current urban problem in Turkey.

Global movements that transform the cities to the rental areas have increased the social polarisation. Therefore, living standards of individuals have been decreased. Besides, their cultural values and local identities have become uninformed. As a result the need of alternative living approaches have arised. As a reaction to the globalisation, individuals have started to possess his urban culture and identity, which is important to him. As it is understood, the urban identity that has been started to be disappear because of globalisation; in still come into discussion as a value that is required to be conserve.

New approaches on Urban Conservation

As a beginning, the concept of conservation was accepted in building scale. In the mid 19th century, the scope of conservation has enlarged and has reached in urban dimension. Firstly, Venice Charter that was approved in 1964 is considered as an important development on protecting civil architectural contexts as a whole. This stance is a sign of an approach that historical cities should be evaluated and conserved as a context. Further with this development, European countries began to focus on wide range historical protecting projects. While transposing to an integrated protection approach, both World Heritage Convention (1972) and Amsterdam Charter were other important developments.

In the 90's, with discussions on urban impacts of globalisation, urban conservation began to be related with new terms such as *intangible/tangible values, authenticity, identity, and spirit of place*. Studies that these new terms were mentioned primarily are The Living Human Treasures Program (1994), and Proclamation of Masterpieces of the Oral and Intangible Heritage of Humanity (1997). These programs mentioned that intangible cultural heritage which was considered as the source of place was under threat due to globalisation and cultural standardisation. Nara Document approved in 1994, declared that the world was getting more globalise and homogeneous and thus the concept of *authenticity* became more important while discussing conservation. In The Australian ICOMOS Burra Charter (1999), it was mentioned that protection of a region or historical construction was very important for the protection of cultural characteristics of *the place*.

Following these developments, it is understood that beginning with late of 20th century, the concepts of local cultural heritage and local identity, played an important role in efforts of urban conservation. New constructions and transformation in the urban areas due to globalisation, brought together urban conservation and management models that have focused on sustainable identity and culture concepts. These new urban conservation approaches can be considered as positive since they protect historical context while aim to develop and continue physical and social assets of cities.

Slow City as an Alternative Approach on Urban Conservation

Cities that are under the threat of standardisation with globalisation, has turned into places with fast and consuming based living styles. As a consequence, people who live there have started to search for healthier and happier live. This search gave birth to a worldwide movement named Slow City with a philosophy of "slow living". Basics of Slow City movement go back to Slow Food Movement founded in 1986. Slow Food movement, which was initiated against opening of a fast food restaurant in one of historical provinces of Rome. It is a standing against living styles, relations and losing freedom of people due to globalisation and speed. Slow Food movement, that originally defends traditionalism and protecting cultural heritage, fulfils its targets by making efforts to survive local and special food.

In 1999, in the Chianti region of Italy, Slow City movement was initiated, which had

Figure 1. Slow Cities in Turkey

been inspired by Slow Food but had wider aims. Thus, Slow Food movement carried to an urban dimension and turned into a union that affected society's way of living. Municipalities have the right to apply for joining to Slow City network for the places with the population less than 50.000. Membership is being realised by fulfilling at least %50 of social, environmental and cultural criteria.

The prior purpose of Slow City is to conserve local identity while providing high living standards for the residents of that city. One important point for Slow City in the name of preventing the city of being standardised in global world is to adopt new urban policies and to protect cultural assets. While Slow City movement is an international network, it shows particularly local conservation approaches (Çerçi, 2013). Slow City is a multi dimensional formation that evaluates environmental, infrastructural, social and economic aspects of the cities. Movement has a charter that gather under its philosophy with certain criteria. Head titles in the charter are; infrastructural policies, energy and environmental policy, quality of urban life policies, agricultural, touristic and artisan policies, policies for hospitality, awareness and training, social cohesion, partnerships.

In order to examine Slow City within the framework of urban conservation context, it is important to discuss these criteria on this issue. In the criteria of "infrastructural policies", is considered the planning of transportation network, reducing vehicle use in historical centres, population control. Developing infrastructure is also a matter of concern while daily life should not harm historical texture.

It is possible to mention "energy and environmental policy" as one of the headings which contributes to urban conservation. According to this criterion, it is important to prohibit the existence of environmental pollution inside the city, to collect waste in the most appropriate way and to use right energy in public areas as well. With this way, urban areas will be conserved.

On the subject of "quality of urban life policies", protection of urban architecture and street improvement are mentioned. Also, traditional trade areas in the cities will be supported and efforts will be made to protect local products. Besides, there are also sub headings focusing on encouraging sustainable urban planning, creating green areas in city centres in order to provide more liveable cities.

Criteria of "agricultural, touristic and artisan policies", is important for protecting intangible cultural heritage of a city. Within this heading, it is important to protect and also

Figure 2. City's memory house restorated in 2013

encourage local crafts and arts, traditional working techniques. Protection of cultural and traditional activities and increasing their values are strongly underlined. That is why certification of local products and building local museums are advised. Also, as a part of Slow Food movement, the charter focuses on encouraging usage of local food.

Another criteria to contribute to city within the context of conservation is "Policies for hospitality, awareness and training". Under this heading, importance of telling the philosophy of the movement to local residents and guests is considered. Within this criterion, the awakening and participation to urban improvement of local people are emphasized.

Finally under the headings of "social cohesion" and "partnerships", it is mentioned that support of both public and institutions has major importance for the sustainability of the movement. The "social cohesion" criterion aims to get together different segments of society, while 'partnerships' criteria aims to provide institutional supports to realise urban development works.

Seferihisar district of Izmir province was the first to take Slow city title in Turkey, in 2009. Thus, Seferihisar became decision centre of union in Turkey. Beginning with 2010, 9 more cities joined the union (Figure 1). These are; Yenipazar (Aydın), Akyaka (Muğla), Gökçeada (Çanakkale), Taraklı (Sakarya), Perşembe (Ordu), Yalvaç (Isparta), Vize (Kırklareli), Halfeti (Şanliurfa) and Şavşat (Artvin).

Seferihisar as a Slow City

Seferihisar is a district of Izmir lying in the western coast of Turkey. It is known that first settlement goes back to 4000 years in this land. There are ruins of antique Teos city that had been built on 299 B.C. After that, numerous states ruled on this land, than joined to Seljuk domination in 12th century and finally Ottoman Empire in 14th century. There are several

Figure 3. Local bazaar of Sigacik

historical constructions inherited from Seljuk and Ottoman periods. Besides, in the Sığacık region, 5 kilometres away from Seferihisar, there is the castle of Sığacık that was built in 16th century (Seferihisar Kaymakamligi, 2004). In the same region, inner castle area and housings are well protected and their organic, narrow streets are kept, residents of city still live in those housings. The historic texture comprise of compact, two-storied, masonry yard type houses. In the area that is conserved on the whole, few houses are damaged and replaced with concrete constructions.

Seferihisar is the first in Turkey to join the union of Slow City. In order to become a member of the union, Seferihisar presented a file to Slow City Coordination Committee including presentation of city, purpose of joining union and details of future projects. Furthermore, city of Seferihisar has been evaluated due to more than 50 criteria of which have to be at least %50 fulfilled that takes place in the regulation of Slow City movement. Seferihisar, which took positive results, joined the union on 28th November 2009 (website of Cittaslow Turkey). Slow City Coordination Committee, began to work in Seferihisar, to achieve all necessary criteria. In order to conserve the urban identity and improve rural quality, a local development model had been formulated while another matter of concern was to get support of residents on Slow City movement (Keskin, 2010). Seferihisar is a good example of including populations to the process in order to get their support and developing and executing urban policies.

Seferihisar is a city whose conservation policies in urban scale could not be effectively processed in previous years. After the membership of Seferihisar to Slow City movement, many projects are realised in order to protect local identity. In this study, these projects are analysed within the perspective of cultural heritage conservation. It is suitable to classify the projects under conservation works of tangible cultural heritage and conservation works of intangible heritage.

Projects related to the conservation of tangible cultural hertiage are analysed under urban scaled, street scaled and building scaled works.

Some urban scaled conservation projects are realised within the framework of "infrastructural policies" criteria. Cycling roads were arranged in some areas of Seferihisar, cycling ports were established and residents were encouraged to ride bicycles (Seferihisar Municipality). But this initiative, which originally aims to reduce the number of vehicles and minimise the possible damage to the natural values, has not given expected results yet. Furthermore, for the purposes of creating proper city centres and recreation areas in accordance with Slow City criteria and revive economic life, project was presented to Izmir Development Agency's "Tourism and Environment Financial Support Program" and the project was accepted. Within this concept, there have been efforts to bring city public outer spaces prepared with landscape gardening principles. In the new public areas, street furniture-representing Cittaslow identity of Seferihisar were designed and some green areas and pedestrian roads were created.

Another urban scaled project is within the context of "environmental policies" criteria. Many good examples are taken into consideration in creating sustainable urban models such as producing energy from renewable sources, using eco friendly transportation vehicles. The main aim here is to reduce the negative effects on city's natural and historical texture (geka.org.tr). There are also good examples like usage of sun powered illumination on streets, efforts to use geothermal energy, building of photovoltaic power station to meet the needs of municipal building and encouragement to use renewable energy. Although there are several projects prepared in accordance with Slow City concept, at this point it is hard to say that the city has totally been using sustainable sources and transportation vehicles that can protect natural and historical texture yet.

Another important urban scaled step is the start of Teos Antique City excavation that was discontinued for 50 years. Slow City Turkey Coordination Representative has declared that, the efforts on conserving cultural and historical heritage come to notice of authorities. Thus, substantially financial support was given to Teos excavations (Köstem B, 2014).

Some of street scaled conservation projects are undertaken within the framework of "quality of urban life policies". Before the acceptance to Slow City, most of historic monuments were already registered. But, since a constant conservation plan was not executed due to the reasons such as change of governance or financial incapability, architectural heritage could not be handled within the context of conservation of local assets. Also due to urban sprawl, many places in the centre of Seferihisar has lost its authentic character until today. In this point, Seferihisar has a negative impression as a member city of Cittaslow union. Thus, the Municipality encouraged some efforts carried in some streets in city centre. One of these works is the rehabilitation of some buildings on Atatürk Avenue and replacement of signboards, which used to be a cause of visual pollution.

Contrary to Seferihisar Centre, in Sigacik innercastle area, the historical texture with old houses and narrow streets are preserved in a large part and the area is considered as an important cultural heritage. Since there had been no extra work in the area before the membership, discordant new buildings were constructed in the historic area. Also some of the historical buildings became neglected. In 2010, street improvement project in the innercastle started with the support of Municipality. Facades of the buildings were renovated as original, energy plaques and infrastructural components were hidden, streets were equipped with wooden furniture. This can be considered as an important development in the name of conserving the identity of city (Figure 2).

Since there has not been any maintained urban-scaled historical architecture area in Seferihisar centre, there is the tendency towards building scaled conservation projects. One of these works is City's Memory House restoration project completed in 2013. Through municipal contributions the house has been renovated and was turned into a museum in which historical documents and goods are exhibited into a café where also some local products are sold. Mayor focused that, in the city where only few numbers of historical buildings were left behind, the existence of such museum would be a good example. Besides, within the framework of Cittaslow, Düzce Madrasah, Ulamış Bath and some historical fountains were also renovated in building scale.

Projects related to the conservation of intangible cultural heritage are analysed under conservation of social practices and events and conservation of local products and craftmanships.

On the purpose of the conservation of social practices and events, organisation of festivals like tangerine festival or seed exchange festival began to be organised related to agricultural, turistic and artisan policies. The aim is to bring together local people and visitors and promote local production (Dalgakiran & Dogrusoy, 2011).

Another organisation realised under conservation of social practices and events is related to "social cohesion" criteria. A meeting between nonlocal and local inhabitant of Seferihisar is organised every year in an effort to create an orientation between different cultures. By this way, the polarisation among different ethnic identities will be prevented and a homogenous identity distribution will be maintained in the urban context.

Within the criteria of "agricultural, touristic and artisan policies", which has a content of contributing to conservation of local products and craftmanships, works have been carried out since 2009 in order to protect local goods and crafts. The most popular and well-known practice is the formation of local bazaar, Sigacik Producer Market, in which producers and consumers meet without any intervals (Figure 3). There have been projects on developing organic agriculture and programs about protecting local crafts and craftsmen. As Dalgakiran and Dogrusoy mentioned, with these projects local residents feel more connected to the place they live in, and local assets become more sustainable (Dalgakiran & Dogrusoy, 2011).

Besides, restaurants and markets which presented only local natural products are opened instead of global chains. The aim is to conserve traditional production as a tangible value of a city, support local producer and present local values to the visitors. One of these markets is "Seferipazari" (market of Seferihisar) set up by local women and produce and sell local products in Seferihisar and also from internet. The organisation get sustainable tourism founding with a project called "Traditional Cuisine of Seferihisar" aims to make local production widespread, bring local products together under a local brand and introduce them to people.

Furthermore, in order to provide a continuance of the projects related to conservation of tangible and intangible cultural heritage, some works are realised under "policies for hospitality, awareness and training" and "partnership" criteria. In this way, projects in the aim of consciousness raising of locals and visitors about slow movement and to provide financial support are put into action.

"Policies for hospitality, awareness and training", is an important criteria to create a support and awareness of residents. This awareness plays an essential role in the success of projects carried so they can tell and justify the projects to the visitors and guests. Within these criteria, tables and billboards giving information have been placed in several parts of the city. Via brochures and internet websites, "slow" destinations were formulated, thus visitors can able to access areas with cultural asset (Figure 4).

Within the context of "partnership", some institutional supports are provided to realise the projects in Seferihisar. Institutional supports are an important part of the organisation to provide financial fund and to accelerate the projects realised under Slow City. Financial funds can be listed as the support of Izmir development agency for the marketing local production and the cost of landscape design projects in Sığacık; the support of the Government for the Blue Flag Project, street renovation Project in Seferihisar and project for thermal water; the support of EU for a sustainable fishing nets project (Öztürk, 2012). Another important support is the sponsorships of private institutions for the excavation of Teos Antique city.

Conclusion

In the past, along with globalisation, city became an intensively interference place. Therefore, the instinctively development of the city has given way to destructive transformations. Although global world creates an association between societies; cultures of societies has began to standardise. The expansion of mass culture has ruled out the conser-

vation of tangible and intangible values, which creates authenticity in urban places. Cities has lost their identity and has transformed into unqualified places.

Slow City is on course to produce solutions to common urban problems of different cultures from several continents. The movement is a planning and conservation model that assimilates charters and declarations within urban context of past years and provide them to put into practice. It can be said that within Slow City movement a great number of works related to protection of local identity and improvement of urban quality of life are realised.

As stated earlier, Seferihisar is a considerably rich city in terms of tangible and intangible heritage like many cities in Turkey. However the city could not be conserved adequately due to inconsistent urban policies in recent years. Governance of Seferihisar that has a consciousness about this issue, made a stride by becoming a member of Slow City that is known as an international union aimed to pursue protection and sustainable policies. Its structure aims not only to conserve of architectural heritage, but also to involve intangible components that creates an urban identity. As well it is related to environmental, economic and infrastructural aspects of the city.

Examinations on Seferihisar made within the scope of this study, indicate that efforts of producing alternative urban conservation solutions are made after the membership. It can be mentioned that, Seferihisar have achieved the awareness of the necessity to conserve both tangible and intangible components of a place with the membership to Slow City. On the other hand, it is observed that the improvement of urban life quality has brought Seferihisar into prominence. This situation has caused a significant immigration and increase of the population and increase in the number of one-day visitors and vehicles with the popularisation. According to evaluations related to projects realised in Seferihisar, it is suitable to mention that Slow City movement has a compatible philosophy and structure to bring an alternative urban conservation approach to 21th century cities.

As long as progresses nonconflicting the philosophy of Slow City will be realised by Seferihisar administration with predictions of the probable problems related to unbalanced urban growth and popularisation, an increasement on effective contributions of urban conservation is estimated. Generation of new alternative urban conservation approaches based on internationally accepted urban development models such as Slow City, may gives local and territorial guidelines for solving problems of disientification and disappreance of local values in Turkey.

References

Bauman Z. (1997) *Globalization, The Human Consequences* (Polity Press, New York)
Cittaslow Fact Sheet, South Eagean Development Agency, , (http://geka.org.tr/yukleme/basili_materyaller/Cittaslow%20Bilgi%20Notu.pdf) accessed 20 May 2015.
Cittaslow International Charter (2014), (http://www.cittaslow.org/download/DocumentiUfficiali/Charter_2014.pdf) accesseed 22 May 2015.
Çerçi, A. (2013) Destınasyon Markalasma ve Yavas Sehır Seferıhısar'in Destınasyon marka Imaji, M.s. Thesis, University of Hacettepe, Turkey.
Dalgakiran A. & Dogrusoy I. T. (2011). 'An Alternative Approach in Sustainable Planning: Slow Urbanism', *International Journal of Architectural Research* 5, 127-142
Ergun C., Günes M. And Ergun A. D. (2013) *Kent Üzerine Özgür Yazilar,* (Baglam Yayinlari, Istanbul).
Giddens A. (1997) *Modernligin Sonuclari,* (Ayrinti Yayinlari, Istanbul).
Keskin E. B. (2010) 'Sürdürülebilir Kent Kavramına Farkli Bir Bakis Olarak Yavas Sehirler: Seferihisar Örnegi, M.s. Thesis, University of Dumlupınar, Turkey.
Kiper P. H. (2004) 'Küresellesme Sürecinde Kentlerin Tarihsel-Kültürel Degerlerinin Korunması, Türkiye Bodrum Örnegi', PhD Thesis, University of Ankara, Turkey
Köstem B. (2014), interview with Slow City Turkey Coordination Representative Bülent Köstem in Seferihisar, Memory House in 6 November 2014, Izmir.
Özkul O. (2013) *Kültür ve Küresellesme* (Açilim Kitap, Istanbul) 119-140
Öztürk, A. (2012). A new policy to understand the city as a human settlement: A rising value Cittaslow, M.A. Thesis, Ege University, Turkey

Robertson R. (1992) *Globalization Social Theory and Global Culture* (Sage Publication, London).
Seferihisar Kaymakamligi (2004), Seferihisar, Seferihisar Kaymakamligi Cevre, Kultur ve Turizm Birligi Yayini, No.1, Izmir, Turkey
Seferihisar Municipality, 'Cittaslow Broshure Series, no:3'.
Sipahi E. B. (2011), '1980 Sonrası Yeni Liberalizm ve Küreselleşmenin Etkisinde Yeni Bir Kentsel Gelisme Bicimi Olarak Güvenlikli Siteler: Konya Örnegi', PhD Thesis, University of Ankara, Turkey, 165.
Slow City Seferihisar website, (http://cittaslowturkiye.org/cittaslow-seferihisar/) accessed 22 May 2015.
Tekeli I. (2014) *'Kent, Kentli Haklari, Kentlesme ve Kentsel Donüsüm'* (Tarih Vakfi Yurt Yayinlari, Istanbul) 29.

New wave of mosque building in Iran, a change in traditional forms

Ario Nasserian, Hassan Osanlo
Draco PhD School, "Sapienza" University of Rome, 53A, via Gramsci, 00197, Rome, Italy
Architectural faculty of Garmsar University (Asihe)
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Abstract

Mosques have been one of the most common specialized buildings in Iran in the Islamic era. Almost from the first day the process of building mosques was combined with a quest to bind Iranian architectural heritage of many centuries with new ideological values of Islam. This led to a constant change in the architectural characteristics of this type of buildings. This process culminated in the 4-Ivan mosques as the summit and a natural and logical result. This Process stopped at a certain point due to the introduction of the modernity to the country and even more important, the flux of the educated architects in to the country.

In this paper, seven contemporary mosques which are very different with the traditional mosques of Iran have been selected and analyzed. Parameters of analysis were the general forms, the elements, the ornaments, their relation to the surrounding neighborhood and their interaction with the city tissue in a small scale.

There are two main claims in this research, first, unlike the usual trend which has been always in a certain and clear way, now there is no logical perspective for developing the classic form of the mosques, thus there can be a turning point on deciding the general form of the mosques in the future. The second claim is that regarding to the changes in the structure of the city tissues and its results, the classic forms off the mosques are neither suitable nor desirable for a contemporary Megapolis like Tehran.

Introduction

There are many elements that are fundamental and characteristic in a city in the Islamic world, Mosques, Madrasas, Caravansarays, Hammams, Bazzars,… . Of these elements, without a doubt the most important, symbolic, defining one is the mosque. A mosque (Masjid) is a place of congregational worship which includes facilities for ablutions-which is obligatory before each time of the five (or three) daily prayers (Salat)- One or more Minarets for the call to prayer, a pulpit (Minbar) for sermon and lectures and a niche (Mihrab) to indicate the direction of the prayer toward holy city of Mecca in Arabian peninsula (Qiblah). (Newby, 2002)

Architectural styles of mosques vary both in general forms and details, due to effect of at least five factors; the climate which dictates the type of the spaces needed for a mosque to function properly, the region that the mosque is built in, the time period of the building of the mosque and its further adjustments and developments, the aspect of the mosque, whether it functions in the context of a neighborhood, a city district, or the whole city (a congregation or Friday mosque) or even a nationwide or imperial mosque and last but not least, the financial sources and support for the building provided by its patrons.

These architectural trends and traditions follow structural details of the mosques which greatly contribute to its form and are also dependent on the materials available in the region, construction systems and methods prevalent and the craftsman and/or artisans at hand in the site of the construction. Another decisive factor in the general form of a mosque and that is the effect of the interactions between different architectural traditions and the Islamic ideology. In the early stage of the expansion of the Islam, it was faced with two different long standing architectural traditions, Persian and Byzantine (Hillenbrand,…..) . And in each region it used that tradition as a first stone to build upon.

With the beginning of the modern and contemporary period, these architectural rules which have been intransgressible for more than a millennium were weakened duo to many factors and new challenges: introduction of the means to minimize the effect of the climate on the function of the spaces inside a mosque, introduction of new construction methods and materials, changes in patronship, arrival of the new architectural traditions from western countries to the architectural culture of Muslim countries via the students who had studied in Europe and went back to work in their own countries, changes in the social status of the Architects form an artisan to an artist, … , together these changes generated enough momentum for a shift of paradigm in the concepts of the mosque architecture and a completely new environment for these buildings.

Historical Background

The natural phenomenon of changes and transition in architecture also apply to this building type, early mosques in Iran were usually columned praying halls around a central court, a form which is very common all over the Islamic world and can be the synthesis of pre-Islamic fire temples and the first mosque in Islam, house of the Prophet which was the embodiment of the Islamic ideologies. So the first type of the mosques in Iran was formed, the Shabestan (prayer hall) mosque.

First step of the evolution of the Iranian mosques was the introduction of three prominent architectural elements in to the building of a mosque: a large and high vault as a portico, Iwan, -a Persian element which transferred to the Islamic architecture through the Sassanid architectural traditions- in the south side of the central court; a dome to cover main praying space and minarets which were the place of the call of prayer and also a way of making the building a landmark, visible from far distances and standing tall within the city texture. These one-Iwan mosques were the first in the line of the Iranian mosques.

Next step in the evolution of the Iranian mosques was the addition of a second Iwan, in front of the first one in the northern side of the central court. So the general form of the mosques up to now were a central courtyard with praying halls on all or some sides, two Iwan in the southern and northern sides and usually a dome over the main praying hall in the south. The mosque could have one or two minarets too. The third and final step was

the addition of two more Iwan on the two remaining sides, so the final general form of the Iranian mosques assuming there were enough land available was a central courtyard with an Iwan in the middle of each side, praying halls around the court, dome on the southern praying hall. This process has been fully discussed with a lot of examples in Pirnia (1991), Figure-1 Shows the evolution from a simple Shabestan mosque to a 4-iwan mosque.

It has to be noted that not all the four-Iwan mosques were meant to be in this form from the beginning, some of them were built in a more basic type and then evolved into the final form. These changes could have been very delicate or profound, in some cases a part is added to the main building, in some instances a part of a Shabestan is destroyed in order to make a large square bay for a dome. Sometimes Iwan were used to cover a large space and sometimes just as mean of transition from the central yard to the dome space. As an example, even the congregation mosque of Isfahan which is a four-Iwan mosque par excellence, was a Shabestan mosque in the beginning.

The transition to the contemporary time, Element of Change

Naturally every major city in the Islamic world has a grand or congregation mosque. Up to the time that the cities were small, usually some mosques in the scale of neighborhoods were sufficient for cities, both as a place of prayer and as a city element which had social effects. Then came the changes: "Since the middle of the twentieth century, the expansion of the population and the spread of the cities and suburbs have led to a further increase in mosque building." (Laleh, 2010) and this was the time that a schism occurred in the process of designing and building : "The great mosques, as well as numerous district ones, follow two different principles of construction: traditional style tends, successfully or unsuccessfully, to respect the classical model; whereas the modern style is influenced more by international architecture." (Laleh, 2010)

The cause of this alienation with tradition, was the fast pace of modernization of the country started with the rule of Reza Shah, which resulted in some un traditional approaches to architecture including an approach which "introduced into Iran a new language that broke all links and continuity with the past" (Micara, 2000). Later, this approach changed into a "more intellectual and abstract idea of tradition" (Micara, 2000) resulting in creating a perspective in which "cities generated a freedom in the elaboration of the architectural language and in the choice of refrences, which went beyond the historical and geographical horizon of Persia". (Micara, 2000)

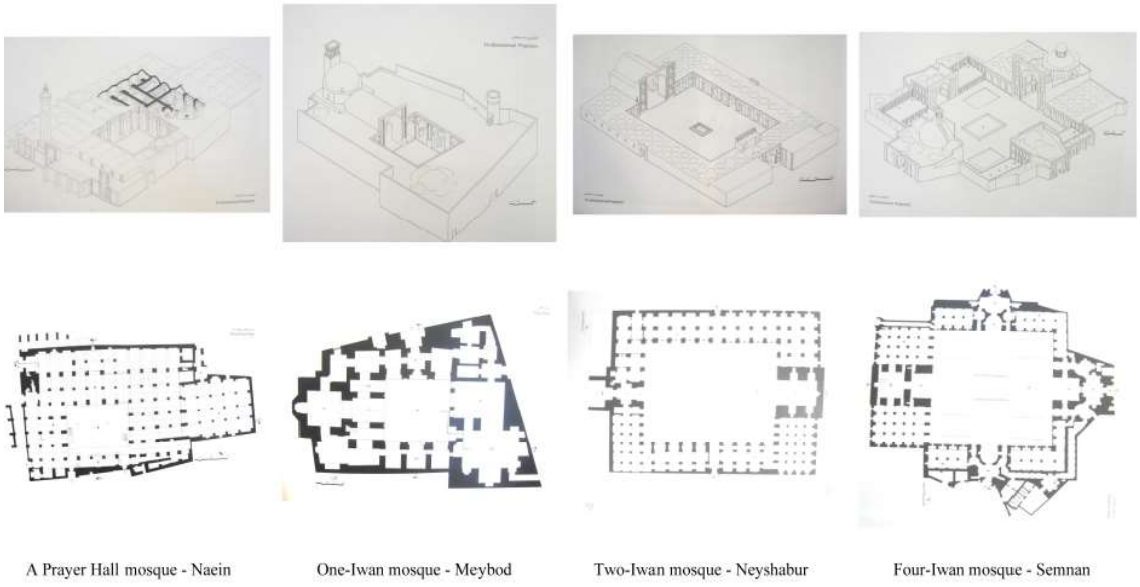
All these changes in the architectural culture of Iran, resulted in the first important untraditional mosque in Iran. Interestingly, the site of the building was the main campus of University of Tehran in the heart of the city. Fig-2-a,b , shows the general form, plan, and Aerial view of this mosque. With the Islamic revolution in 1979 and the coming to power of a clerical government, a radical shift in government policies with the aim of preserving and propagating the religious values took place. The process of highlighting religion in all aspects of life started. Due to the importance of the mosques as the most imposing symbol of Islam and thus the government, a huge effort put on symbolizing mosques as national and holy places and also building new mosques. In Fig-2-c, the extent of these efforts are shown. (Abrahamian, 2008)

Parallel to this effort, a new wave of mosque building in the huge scales started. Fig-2-d shows the largest example of these projects which started in Tehran and is still under construction.

There was also another drastic change, many activities added to the routine activities of a mosque which actually converted the functions and roles of this building. Activities like the centers for the volunteer militia for the 8 years Iran-Iraq war or the cultural centers for the religious youth were added to the traditional praying activities which were based in the mosques. The need for more spaces for these functions, like libraries, study rooms and… resulted in mosques with more complicated plans, and even more complicated spaces in form of multistory buildings.

These three factors (Propaganda, wave of construction and new activities in the building) influenced the architecture of the mosques gravely especially in recent years. As it

Figure 1. Evolution of the Iranian mosques



can be seen in the Fig-2-d, in major projects that started under direct influence of government in early 80's the general 4-iwan form of the mosque was kept, the central court and the praying hall and the dome, together with main minarets also were preserved.

In the private built mosques and those which were built with less direct involvement of government, there were more variations and also more deviation from the traditional forms. One can single out for main reasons for these variations, first and maybe the most important was the fact that the scale of the function these new mosques usually was reduced to a small neighborhood, and in very rare cases a district of the city, so they were usually reduced in size. This reduction of the size was in contradiction with the fundamental concept of the central court, which required a large space for this element comparing to the main building. Second reason of this variation was the general trend of buildings, using new materials like marble stones and new colors like white in facades, new and unusual volumes like pyramids in domes and polygons in the plans, eliminating distinctive elements like minarets, domes and Shabestans. All of these trends are more or less visible in the secular, residential and other specialized buildings which were being built at the same time. Third reason of this deviation from tradition and variation can be the will of the architects and patrons to make a building which is not only remarkable, but also noticeable and different in sight.

One more site-related aspect which resulted in this change, was the effect of the surrounding, while old mosques were largely affected by the surrounding urban texture, these new mosques were almost totally self-centered buildings, some of them were even lone standing buildings without any connection to the neighboring buildings and in some rare examples in the middle of a green area, this new arrangement gives a monumental/ sculptural character to the building. Fig-2, demonstrating the Tehran university mosque shows an example of such buildings.

Another new aspect in these new mosques was the introduction of facades, especially with the free standing mosques which were visible from many sides, the question of the visible façade went much further than an entry - traditionally a minerated portal – that was usually the only visible interface of a mosque with the rest of the city. Fig-2-e,f shows the comparison of the façade in a minor contemporary mosque in Tehran (under construction) and a traditional façade for a mosque.

Figure 2. Examples of the rapid changes in the physical appearance and concept of a mosque

A

B

C

D

E

F

A survey of some selected contemporary and recent mosques

Although in theory every mosque is important in the Islamic tradition and beliefs, for certain reasons some of them are more important than the others. These reasons can vary, some mosques include or are built near an important tomb, some of them have political importance, some of them can be congregation mosques of a city, some of them have a rich history, some of them are important due to their sheer size or their important location, some of them are important because of their architectural heritage, and… It seems logical that in order to inspect and evaluate the trend of mosque building one considers the more important mosques and not the minor ones.

For the purpose of this paper, we have focused on seven of the highly publicized and most debated mosques of Tehran. These mosques usually were criticized at the time of their construction because of their unusual and untraditional appearance. These debates were a source of growing public attention to these buildings which resulted in them becoming more and more famous and sometimes achieving a unique status and part of the architectural character of a neighborhood. To do this investigation, 3 mosques of the transitory period and 4 mosques of the recent years have been studied.

In order to compare the temporary mosques of Tehran with the mosques built according to the tradition, some criteria were needed. A range of the different criteria considering the aim of each study can be selected to name a few one can point to height, stories, land covering, facades, relation with neighboring buildings, relation to the urban landscape, relation to the surrounding walkways and motorways, … (Allain, 2004)

Al Ghadir mosque, Building of this mosque started in the 1976, before the revolution of 1979 and finished in 1981. The mosque follows a very untraditional form. It is a combination of two solid cubes, there are no traditional minarets in the buildings, it lacks the important and traditional element of iwan, the form of the dome is not a semi-sphere or onion shaped one, it doesn't have the usual shabestans which was a gathering place for the prayers, it lacks the central court which can be an antithesis of the outer crowded area of the neighborhood. Fig-3-a, shows the plans and the aerial view of the site of this mosque.

The steel construction allows for large spans, a very unusual form of dome and also a 3 story building over a basement which has a very interesting consequence, the ratio of constructed area to the ground area in this mosque is around 2.5 which is much more than this ratio in the traditional mosques which is less than 1 and usually around 0.5. Fig-3-a also shows the section of the multi story building and the construction details of the dome.

Al Javad Mosque, built in late 60's it was the first modern mosque of Tehran, at the time of building and after that it was criticized heavily and even now it is used as an example of a building without any resemblance of its function. Building is built in two parts, a cubic part which is a conference hall, a brand new function in a mosque up to that day, and a pyramid like volume which has the function of a Shabestan. The cubic is like every other building in the city with the same function and not important to investigate. Fig-3-b shows the section of the Pyramid parts from original blueprints.

The use of new construction material in form of the concrete plates and shells, steel truss of the roofing and the glass covering of the façade is the origin of a huge diversity with the original and traditional forms of the mosques used in Iran for centuries. Again many elements of the traditional mosques are absent, minarets, iwans, central courts and… mosque lies in a piece of land which has three free sides, but has no significant entrance towards the adjacent streets, thus eliminating another important architectural element, the portal. Though it doesn't cover the whole construction site, still the ratio of the construction to the land is more than 1 thanks to the building being multistory. As the regulations of the urban planning of the time had a restriction to the height of the buildings, it has been tried to use other means to make the visual appearance of the building significant. In other words, the architect of this building has tried to give it a monumental presence, ignoring all the urban tissue surrounding it. (Fig-3-b)

Prophet Ibrahim Mosque, constructed in 60's, it was built by a traditional architect who was not influenced by the academic system of architectural education usually copied from the European schools of architecture. Naturally one can expect that it would

be something between traditional and modern mosques. It is located in the middle of the old Tehran international exhibition site, so it has a large free space around it and thus not influenced by the limitations on the ground or the adjacent buildings. This mosque has some elements of the traditional mosques, including the dome, minaret, portal, Shabestan and … but some of them have been drastically distorted beyond recognition by the Iranian architectural tradition. As an example, though the pyramid domes have been widely used in tombs in Iran, their use in the mosques is very unusual, or though there is no strict rule on the number of minarets in a mosque, there is the Shiite suggestion that it is nice for the mosques to have two minarets not taller than their dome, so this mosques almost follows a Sunni rule for mosques. Fig-3-c shows the section of the building by the original blue prints which gives the details of the dome, praying halls and highlights the false façade, also its current view from the portal side.Looking at the picture, it becomes very obvious that the building again tends to have a monumental form, its structure is heavily relying on modern building materials to build the dome, minaret and the basement.

Congregation mosque of Shahrake Gharb, This mosque, built in 1995 in the heart of one of the most modern and richest part of the city of Tehran, again has many elements of the traditional mosques, domes, high portal inspired by grand mosque of Yazd, minarets, decorations and oraments and… but there have been changes to these elements in many ways. The main function of these mosque is not the daily prayers but the mourning ceremonies and there are completely new elements introduced to the mosque to serve this function. As it can be seen in Fig-3-d, basements are large and are designed as the parking lots and conference halls of the complex, again it is obvious that large central flat-covered areas are heavily dependent on the moment frames of the structure. Looking at architectural elements of this mosque it is obvious that they have changed from the original form but not to a huge extent.

Qods mosque, this mosque, built in the past decade was on the receiving end of the harshest possible critics from the religious circles and religious architects for its non-traditional and anti-Islamic appearance. It has a very simple form, build in 4 levels, and the dome is replaced by a folded plate.

Fig-3-e shows clearly displays the importance of placing. It is obvious that one more time, the building tends to have a monumental form, segregated from the surrounding buildings, roads and urban tissue. The mosque is once more a centralized building, without any voids in plan which resemble the central court idea, the building mass is compacted and tends to use the vertical space than the horizontal one.

Imam Reza mosque and cultural center, another very recent building in the center of Tehran, it is built in a neighborhood that is generally considered to be a poor one. It is a multi-purpose complex, but its most dominant function (at least officially) is of a mosque. Again the building is very centralized, lacks the traditional voids, prefers the vertical extension to the horizontal one, lacks the traditional elements like domes and minarets, and tries to impose itself on the neighboring area. (Fig-3-f)

Like the previous examples, it is located at the intersection of some main roads inside the city, it goes to underground level to provide the parking space, It uses some accompanying buildings (like Al-Javad or Congregation mosque of shahrake Gharb) for the functions other than praying. The mosque puts a huge emphasize on façade and uses a modern version of traditional building materials of bricks and ceramics.

Vali-e-Asr mosque, last surveyed mosque is a classic battle ground of the two approaches to the mosque building, it was first designed as a huge traditional mosque then the design changed in order to build a very unusual mosque. In this mosque all of the classic elements are eliminated, No dome, no minarets, no portal, no central court, … and for the first time in Iranian architecture the mosque roof is used as an architectural element. Fig -3-g shows the initial and final design of this mosque. Also it can be seen that once more there is an extensive use of the underground space in form of basements which are used as parking, there is special attention toward the façade of the building, the building is without a connection to the urban tissue and acts as a stand-alone building and it is very close to the crossing of two important avenues.

Figure 3. Seven Case studies of Tehran mosques

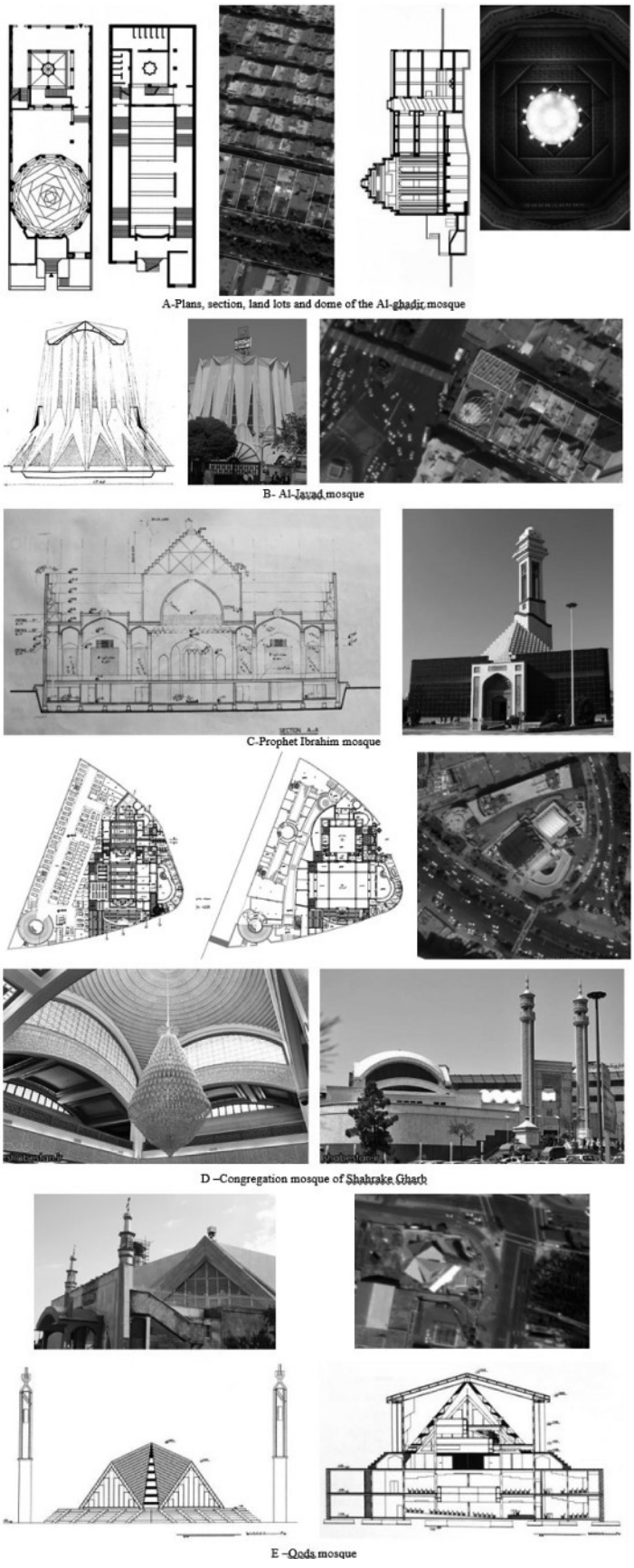
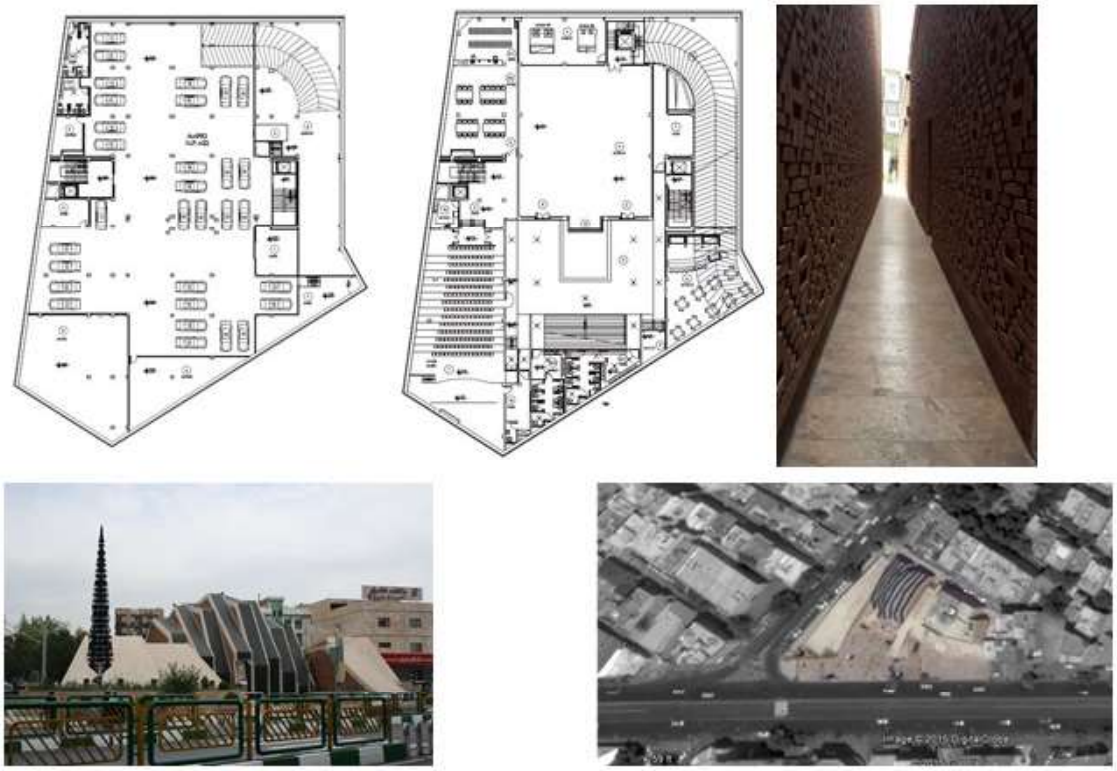
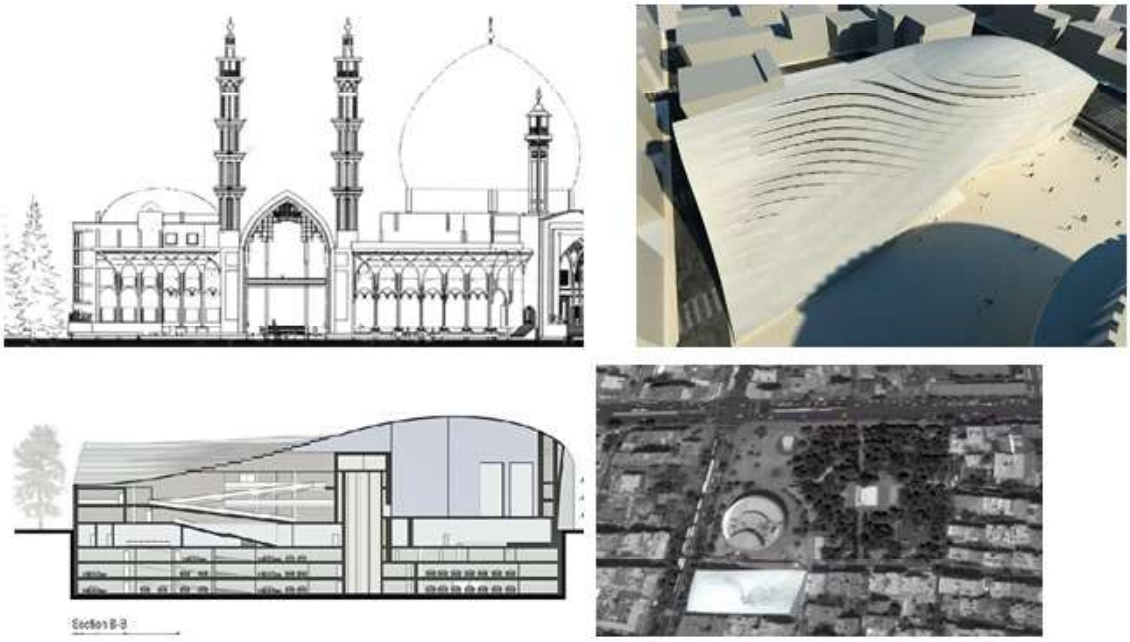


Figure 3b. Seven Case studies of Tehran mosques



F – Imam Reza mosque



G – Vali-e-Asr mosque

Summary of the Survey

- Back to the criteria we introduced for making our comparison, one can reach to this summary:
- The evolution of the form of the mosque has stopped and the traditional forms have gave way to more modern, innovative and much diverse ones.
- The height of the mosques are getting higher than before that is due to use of the modern structural materials and technics.
- The mosques are getting multi-story buildings which is totally new for this type of building.
- The land coverage ratio of the mosques is almost doubling in regard to old ones with a major agent being the elimination of large courts. Also the building to land area ratio is getting four times or five times more than traditional mosques, mostly because of the multi-story construction.
- Façade is getting a much more important role than what it used to be, the original façade of a mosque which was its entrance portal either is eliminated or is distorted beyond recognition.
- Buildings are usually separated from their neighboring and tending to have a monumental appearance.
- Unlike the traditional mosques which were in close relationship with other major elements of the city like Bazars or Madrasas, these buildings have no connections with other urban elements.
- They tend to be closer to major streets or preferably crossing of two major streets which provides them with a good location to become a monumental building.
- Traditional forms of domes and iwans are almost totally disappeared or are substituted with new, distorted forms.

Conclusion

The changes in the forms of the mosques has been traced, surveyed and discussed (Holod and Khan, 1997). It is a phenomenon in happening and ongoing. In this paper, it was shown that this phenomenon has physical and formal aspects in the scale of the building itself but not limited to that. These changes in form happen in all possible ways: heights, shapes, construction ratios, facades, colors, material, relationship with avenues, roles in providing parking space,…

These changes, unlike the traditional development of mosques, don't follow a unique route, the contemporary mosques vary very much with each other, which can be an indicator of a multi cultured and multi layered society and can show the influence of the contemporary architecture of the world in Iranian religious architecture.

References

Newby, G.D (2002), 'A CONCISE ENCYCLOPEDIA OF ISLAM', (Oneworld Publications, Oxford, England).
Pirnia, M.K., (1991), 'AN introduction to Islamic architecture of Iran', (Science and Industry University, Tehran, Iran).
Hillenbrand, R.(2004), 'Islamic Architecture: Form, Function, and Meaning', (Columbia University Press, U.S.A).
Laleh, H (2010), in 'The Splendour of Iran' Originator E Booth Clibborne, general editor Pour Njavadi, Volume II, Islamic period, Ed. C.Parham, (Booth Clibborne editions, London, England).
Allain, R,(2004) , "Morphologie urbaine. Géographie, aménagement et architecture de la ville", A. Colin, coll. U Géographie, Paris, France.
Micara, L. (1996) 'Contemporary Iranian Architecture in Search for a New Identity.' In Environmental Design: Journal of the Islamic Environmental Design Research Centre 1, edited by Attilo Petruccioli, 52-91(Dell'oca Editore, Rome).
Abrahamian, E. (2008), "A HISTORY OF MODERN IRAN" (Cambridge University press, New York, U.S.A).
Bani Masood, A.H (2008) 'Contemporary architecture of Iran' (Honare-e Memari, Tehran, Iran).
Holod, R. and Hasan Uddin Khan, (1997) 'The Mosque and the modern world'(Rizzoli, Italy).

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Chair_Dina Nencini I Tolga Ünlü
DiAP Department of Architecture and design, "Sapienza" University of Rome, 53A, via Gramsci, 00197, Rome, Italy
Department of City and Regional Planning and Centre for Mediterranean Urban Studiesat Mersin University, Turkey
Co-Chair_Angela Fiorelli I Nicola D'Addabbo
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Knots
New Trends in Urban Design

Public Spaces

Modern and Contemporary Urban Fabric
Typological Process
Urban Growth

Open space as founding place. Italian piazza

Dina Nencini
DiAP Department of Architecture and design, "Sapienza" University of Rome, via Gramsci 53A, 00197, Rome, Italy
Keywords: Italian piazza, urban morfology, city, public spaces

Abstract

Contemporary city is mostly interested by modification and transformation: the architectural design is almost exclusively the intervention on existing city. In this context, the public space has long been a crucial part of this renewal. On the other hand the assumptions on open spaces were oriented mainly towards functionalist horizons, "public space" is a definition too partial that unbalances the disciplinary interest towards the uses of places instead of morphology studies.

We can say that the Italian "piazza" was studied with alternating attention to become an entity crystallized and iconic, a figure that does not belong and does not contribute more to the construction of urban form but which reached drifts media seemingly unstoppable.

In contradiction to its original constitution, founded on the open space, the contemporary city is a city of buildings, objects juxtaposed, as anticipated by Colin Rowe in Collage city (1978).

Keeping on my studies on Italian Piazza (Nencini, D. (2012) La Piazza. Ragioni e significati nell'architettura italiana, Christian Marinotti editore), the goal will be to present a deeply analyzed collection of studies on urban form and open spaces of Italian architectural culture, to present innovative contributions with the intent to specify the tools and the project actions necessary to redefine the role that the piazza has always had in the construction of city.

This paper is divided in two parts: the first one considering Italian piazza as a place merging cultural and social caracters; the second part concerning design practices and example.

Of course these two parts are connecting each other, but not directly. In fact cultural dimension emphasizes how be perceived and translate public space in a common knowledge. The second part instead of first, tended forward technical and operational action to design or redefine piazza as a founding place of the urban form.

The Piazza as iconic place of contemporary human living

The contemporary condition of architecture and city is at the very least chaotic. We may affirm that the concept of Modern city has never fully realized except in sporadic cases. The iper-metropolis, or the sprawl expresses somehow a project of a culture?

Zigmunt Bauman examines how we have moved away from a a heavy and a solid, hardware-focused modernity to a light and liquid, software-based modernity. This liquid society allows only what is gaining the public endorsement, achieved through media. But if this is true, architecture, for which is determinant the condition of permanence, become secondary and not relevant.

In this framework briefly underline the "piazza" undertakes particular importance.

So now I have to introduce the concept of "iconicity".

As Pavel Florenskij wrote: " The icon is the most permanent there may be in the representation, it is the aspiration to represent the archetype with the essential claim of objectivity."[1] It is the irrelevance par excellence, the transcendence of life in the fixity, like in a *Still Life painting*.

The Italian Piazza represent the icon of stability and permanence, of durability of materials, the founding reason of urban form, and finally is the aim of an absolute expression of living. So Piazza can ones more becoming a monument itself. That means a deep transformation of uses and senses of urban spaces. To be an icon, to be consider a monument, it means that the piazza has to becomes a strength against transformation and a resisting part in the urban structure. In my research the first step extabilished that it is a particular Italian way to intend architecture and urban open space and also a particular collective thought that influenced the vision of urban open space. That means that metaphysical and realistic culture are both crucial. If we translate these two cultural positions in designing approach it means two different way to consider materials, light and form so the relationship of time and space.

Two figures of strength urban structure

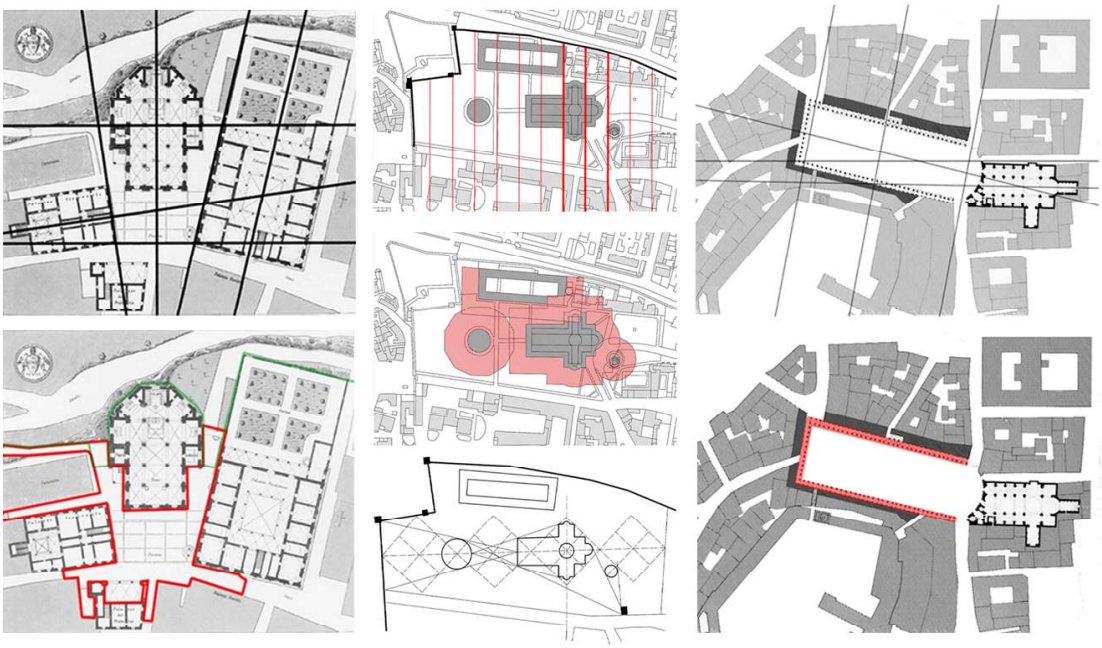
Piazza as we well known exists for the moment of Italian Metaphysical painting and German "Magischer Realismus". These representations of Piazza duplicate its entity in two material and immaterial situations, introducing a new relationship between space and time, but especially its interpretation identify a specific condition of space, light and materials, linked to a particular geographical and cultural context.

As you know Metaphysical painting «in which art is a magic disclosure of the deepest sense of reality» as wrote Elena Pontiggia[2] and the *Magischer Realismus* in the definition of Franz Roh, describe the real but strange atmospheres of painting of *Neue Sachlichkeit,* and translate in Italy by Massimo Bontempelli poetic of Realismo magico. The magic realism, the union of real and magic, define a vision of life and art in which dominate absence and predominate lightness, translating by a particular use of volume and material: the elements of the composition are separated and recognizable themselves as Heinrich Wölfflin say about the Italian Renaissance. So architectural form aiming to perform per-

[1]Pavel Florenskij, *Le porte regali. Saggio sull'icona*, 1922, Adelphi, Milano 1977

[2]Elena Pontiggia, Bontempelli e gli artisti, in Massimo Bontempelli. Realismo magico e altri scritti, Abscondita, 2006, pg. 131

Figure 1. Italian piazza's diagrams, Pienza, Pisa, Vigevano



fection trough the identification of limits of every single parts of the whole. Everything that define Metaphysical piazza is relating with form and space like absolute entities: isolation of elements, stillness and lightness determine the spatial idea of city. The objects remain like in a still life, reducing the role of space to become completely and absolutly form.

The piazza as a founding place of urban structure disappear with modern movement. The main reason is the conception of space by modern architects, for them the piazza doesn't exist because they don't consider the existence of hierarchy but for Italian architect this dogmatic position is less important.

Rituals and durability

The piazza is both a physical defined by a precise disposition, but also the place of a representation in which it shows a ritual of life. The ritual is what makes possible the construction of a tale becoming true. In such a way the functional dimension of space becomes less important because we don't need only to use the public space but to define a framework of collective narration.

If the durability lets to be possible the permanence of architecture in the flowing of the time, the ritual lets architecture to be a collective representation.

Richard Sennet talks about ritual as a event that shows repetition, transformation and drama representation. Sennet says that in the contemporary time its impossible to built up a epic collective narration, this determine the exponential functionalist approach to the open urban spaces design.

If the Piazza is an icon, it is also considered the thing that holds historical center beauty, or a possibility to reverse the destiny of the districts against urban sprawl. If we go back to the originally reason of the existence of urban open spaces, we have to consider that the void and the buildings are together two entities of the urban unity. We have to reconsider the void in a morphological and not only functional approach. It means that piazza is not only a public space: in this case defining only by use, but also a specific material for the definition of cities. The characteristics of this material are typological and morphological represented in two archetypes: Piazza Ducale a Vigevano and Campo dei Miracoli a Pisa. These two archetypical examples are defining by two different designing

Figure 2. Franco Purini, Gibellina's piazza, view inside the piazza

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Figure 3. Gianugo Polesello, Piazza in Udine, planivolumetric drawing

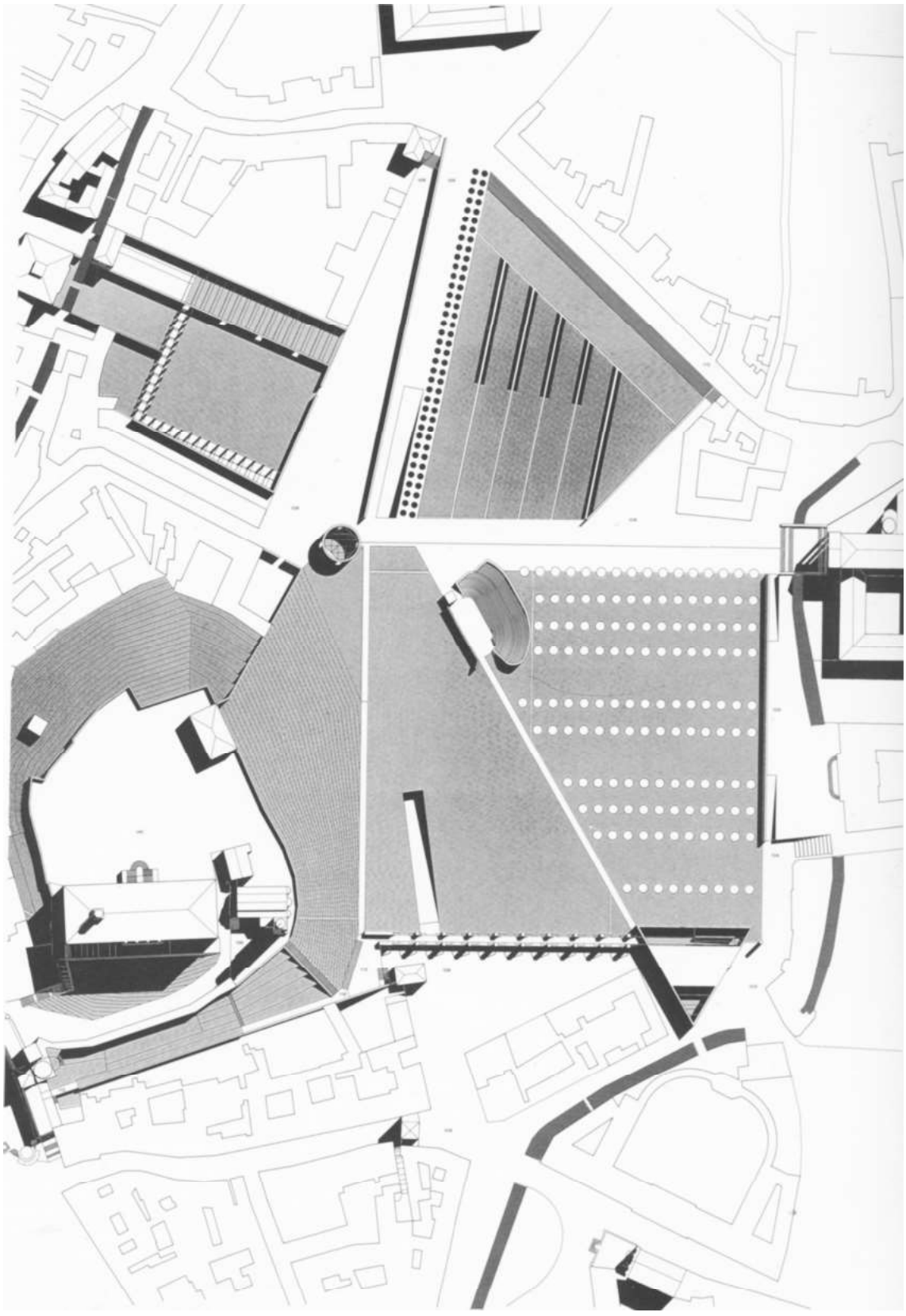
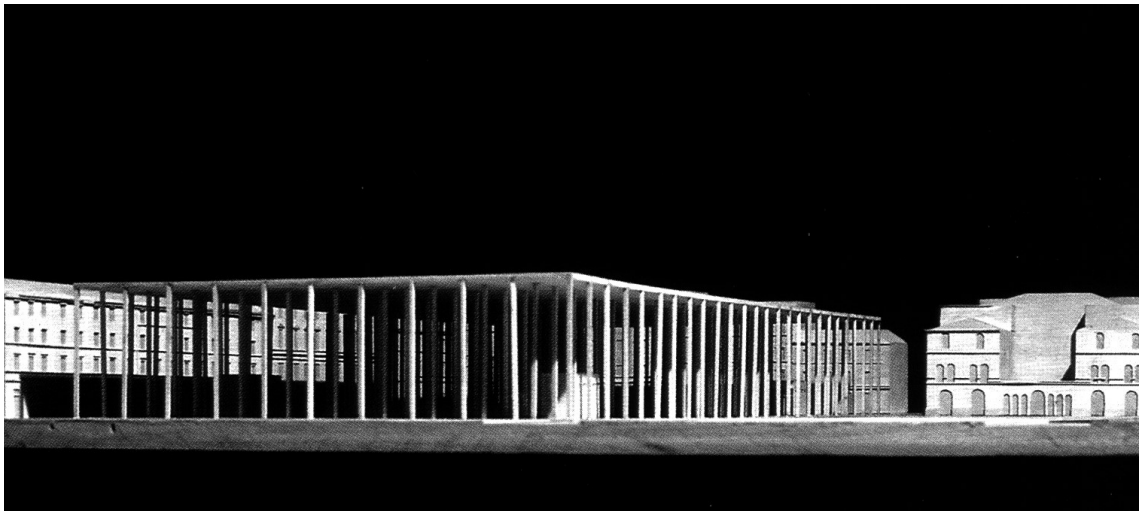


Figure 4. Antonio Monestiroli, Piazza in Ancona, model



actions: delimitation and disposition. All the Italian piazza can be bring back to the two archetypes on which are based the two piazza. So hierarchy of elements, the delimitation of space and disposition of objects are the main assumptions on which we can base the design approach to the urban open space. I show as example some projects and realization of Italian architects in which they try to realized the actualization of our culture of design urban open spaces. These study cases are compared indirectly with three historical piazzas: Pienza, Campo dei Miracoli and Vigevano. These three piazzas are like archetypes of urban space, and the modern examples are referred to them: Gibellina piazzas designed by Franco Purini, Segrate piazza designed by Aldo Rossi, Udine piazza designed by Gianugo Polesello, and Ancona piazza designed by Antonio Monestiroli.

1965. The piazza of the Segrate Town Hall is identified by a wall that delimits. The wall is necessary to distinguish the space of the square from a non-tissue built around high buildings to which, at the time of realization, was the background countryside.

1978. The theme of the new arrangement of the square in Ancona is employed by Antonio Monestiroli as profoundly urban. The block, will be demolished in the administration's intentions, to make space inside two important roads in the urban plot. Monestiroli disclaims the theme centering the issue on the reconstruction of the block and recovering missing the relationship between tissue and plot, between void spaces and buildings.

1981. The piazza in Udine, inner the historical center, is designed like an urban landscape, defined by border pre-existent elements as a physical entity, the castle, the portico, and so on disposed on a horizontal surface.

1982-1990 The system of squares of Gibellina is certainly an emblematic project in the definition of urban open spaces. The limit that defines the squares is represented by a porch that delimits longitudinally. The relationship established by the porticoes with the tissue of the house is oriented to contain and redefine the void, "the shapeless widening that existed in the tissue"

Some misunderstandings

At the conclusion of this research I think I can say that this depends mostly to some misunderstandings inherent in the identification of the fundamental characteristics of the piazza, we may collect in a hypothetical and temporary classification of what until now has been achieved in urban areas in Italy.

The first misunderstanding concerns what goes under the name of decorum, which leads to align the square with the street furniture. In this case the square is not part of the urban structure, but only responds to technical and functional reasons. the study about space it

should request the intervention is replaced by solutions mainly oriented to establish the pavements, lighting, chairs.

The second misunderstanding concerns the conviction that the square should still be a place of social rebirth. We saw how the piazza is the place of origin and identification of urban space and so of the representation of the society that gathered in it.

If we recognize and study this generative relationship, it is not to re-propose the procedures for setting up in a time and in a space compatible with the past, because the results could only be naïf and anachronistic. The piazza can be naïf especially when the materials used are high-tech innovation and to refer to the future.

The piazza in this case becomes a container in which the art work should give meaning. The misunderstood interpretation of the open space as the primary place of manifestation of the collectivity reduced to "be good dress space", in which what has degenerated it is the representation of the relationship between space and society.

The fourth misunderstanding is what means the architectural intervention as the only engine of urban regeneration. The principle that underlies it, frequently comes down to "cosmetic" actions rather than architectural intervention.

References

Giovannoni, G., (1931) *Vecchie città, edilizia nuova* (Unione tipografico – Editrice torinese).
Laugier, Marc-Antoine (1753) *Essai sur l'Architecture*, trad.it. (1987) Saggio sull'architettura (Aesthetica, Palermo).
Monestiroli, A., (1994) *L'arte di costruire la città.* Conferenza tenuta al Do.CO.MO.MO. Barcellona, in Macchi Cassia, C. (1998) Progetto del territorio urbano (Franco Angeli, Milano).
Samonà, G., (1975) *L'unità architettura-urbanistica, Scritti e progetti,* 1929-1973, a cura di Lovero, P. (Franco Angeli, Milano).
Dardi, C., (1988) *Elogio della Piazza*, in "Spaziosport", n.1, pg. 98-99
Samonà, G., (1980) *Un'esperienza di pianificazione territoriale in Italia* (Caramassima, Bari).
Purini, F., (1989) *La sana inutilità delle piazze, in Luogo e progetto* (edizioni Kappa, Roma).
Bettini, S., (1978) *Lo spazio architettonico da Roma a Bisanzio* (edizioni Dedalo, Bari).
Choisy, A., (1899) *Histoire de l'Architecture.*

The Italian Piazza – Methods for Comprehensive Analysis

Donald Corner, Jenny Young
Department of Architecture, University of Oregon, Eugene, OR, United States of America
Keywords: piazza, form, fabric, use

Abstract

Through a project carried out over the last several years in the Marche and Veneto regions of Italy, we have developed a set of criteria for recording and evaluating the physical attributes of successful public squares. The analysis is structured around three poles of consideration (FORM, FABRIC and USE) each of which is divided into aspects that relate to the adjacent poles (diagram above). FORM identifies the quantitative attributes of the piazza (Space) including plan size and shape, section ratios of width to depth, percentage of perimeter enclosure and qualitative assessments of what the shape connotes. FORM also addresses compositional attributes of the piazza (Dynamics) including spatial typology, hierarchy of spatial markers, and kinesthetic experience. FABRIC addresses the linkages of the piazza to the larger context of the neighborhood (Connections) and the character of the physical elements that define the space (Containment). USE inventories the ways people interact with the piazza (Patterns of Use) recording evidence of activities in space, the various types of users, the flow of people and cars, distribution of activities at the ground floor, the number and location of entrances, and activities on the floors above. The fine-grained elaboration of the space (Details) is recorded in terms of the materials and furnishings, symbols and memorials that bring beauty, character and meaning to the lives of inhabitants. These analytics provide a basis to compare piazzas, one to another, for the purpose of generating principles to guide improvements to existing piazzas and inform the design of new ones.

Introduction

The cathedral at Fermo (Italy) stands on an eastward spur of the Sibillini Mountains, overlooking the Adriatic Sea. Concentric rings of streets cascade down the hill, following the contours. Just below the cathedral the street network expands to form the Piazza del Popolo, an elongated, irregular shape said to resemble a forearm and "bracciale," the spiked wooden glove worn in a Renaissance era ball sport. After school, city busses bring the youth of town up a late 19th century viale that reaches what should properly be the back garden of a palazzo that enfronts the head of the square. The portone passage of the old palace acts as a gate, admitting the students to the piazza at the highest point. They descend the gentle slope in groups, passing cafes and gelato shops, bound for the city library at the lower end, or perhaps the clothing stores that line city streets just beyond. Elder citizens observe their passing from the shelter of vaulted stone porticoes lining the long edges of the piazza, those on the east side belonging to a slender building, purpose built to enclose the civic space and house an early city hospital over shops at piazza level. Above the raised entry of the Palazzo dei Priori, a commemorative statue of native son, Pope Sixtus V presides over the routines and rituals of the community.

Methodology

Assisted by students from the University of Oregon, we have had the opportunity to observe and record daily life in town centers, large and small, throughout the Marché, Tuscany and Veneto regions of Italy. The challenge has been to develop a structured, comprehensive approach that embraces the full range of attributes found in a successful public square. The goal of the analysis is to understand and enjoy these rich urban settings and to develop criteria that can be used to compare one piazza to another, generating principles that are predictive of success in making places for people of all generations.

Participation in the analysis makes a unique contribution to the education of architects. In the Italian piazza, the spatial, material and behavioral aspects of design are inextricably bound to one another. Our research flows from theoretical traditions at the University of California, Berkeley and at Oregon within which formal and behavioral considerations are understood to be alternate sides of the same coin. The piazza is a powerful ally in driving home this point. Sharing in this research, students have come to understand the making of lively, meaningful public spaces while at the same time appreciating deeper principles of inclusive design.

The Model

The conceptual structure for these investigations draws inspiration from the geochemical cycle of geology. The so-called "rock cycle" depicts, in diagrammatic form, all the generative products and processes of the earth's crust: both its forms and its activities. The cycle relates igneous, sedimentary and metamorphic rocks and identifies the mechanisms of disintegration, lithification, intrusion, etc. that quite literally tie one group to the other.

Study of the piazza is structured around an analogous diagram featuring three poles of consideration: form, fabric and use. These represent the spatial, material, and behavioral aspects of place. Each of the primary categories is divided into component parts that demonstrate the connections to the adjacent poles. (Figure 1)

Form

The first category of "Form" identifies physical attributes of the piazza as a space, a larger void in the urban fabric, a room in the city.

Form: Dimension

This sub-category begins with the immediately measurable. How big is the space in

length, width and area? How deep is the space in both absolute terms and in terms of the plan/section ratios identified by Camillo Sitte. (Sitte, 1965) These quantities lead directly to qualitative assessments. Is the space the proper size in relation to the community of users that it is intended to serve? Is the location within the city appropriate to the type of piazza in question? While the ratio of width to depth helps us to assess the feeling of enclosure, there are limits on the useful height of surrounding buildings no matter how large the space. The classic measure is our ability to have a relationship with the upper parts of the buildings, to appreciate architectural detail or to recognize faces that appear in the windows. Such judgments inevitably lead to a discussion of perceived scale versus simple size.

The impact of section ratios is greatly affected by plan ratios. A long thin piazza may be very deep in the transverse section, but offers a view of the sky though the ends. Plan form matters. Irregular shapes can be more interesting, to a degree, but they must remain coherent and imageable, rather than fragmented. One can tally the percentage of enclosure offered by surrounding walls, guarding against broad streets that allow the space to leak out. At the same time, one has to be sensitive to the tremendous interest created by linked piazzas where relief from excessive enclosure is offered by the hint of something just beyond, around the corner.

Slope in the piazza floor can dramatically influence the sense of enclosure or direction of focus, but beyond a certain measure the slope changes the activity, making it uncomfortable to stand, or stroll, or awkward to spread out tables and chairs. Final measures relate to climate and comfort: solar orientation, the seasonal possibilities of sun and shade, blocking the wind or admitting a breeze.

Form: Dynamics

The dynamics of space is an elusive but fascinating quality. It is the realm in which the piazza has much to teach architects about the choreography of rich and interesting spaces in general. It is about the kinesthetic experience, reading a space by moving through it, understanding the difference between path and place.

There are numerous spatial typologies in the literature, but each attempt at classification is fraught with compromise. Invariably the most interesting examples blend several of the proposed categories. It is often better to survey the basic elements and summarize the unique personality of each individual example.

One can begin by mapping points of focus, axes, and directionality. What are the elements that anchor these dynamics? In civic space there is often a dominant building that provides both a focus and at times a backdrop. Where that major building is placed matters a great deal. Camillo Sitte distinguished between rectangular spaces with a major building centered in a long side (Breitenplatz) and rectangles with the main building at the far end (Tiefenplatz) (Sitte, 1965).

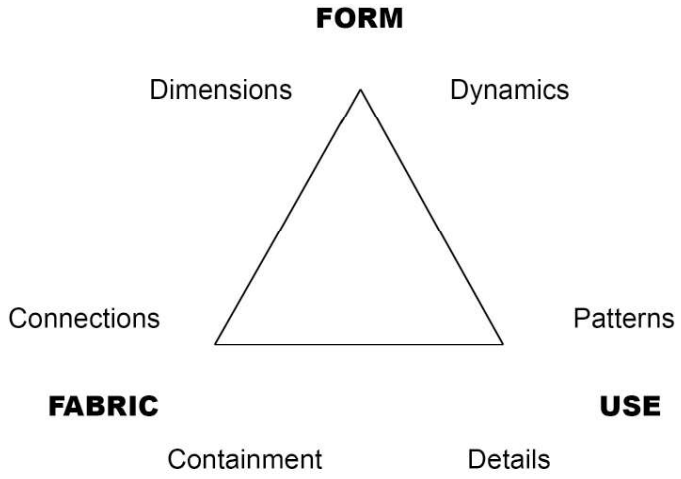
Tall elements, like towers, columns or clocks can bring balance or contrast to the order initiated by the main buildings. It is important to note the variety of spatial markers, the differences in their scale and whether there is a hierarchy established among them. Contrasts in height should reinforce the hierarchy, not contradict it. Spatial markers may establish local symmetries even in an asymmetrical space. They can establish a dominant axis, an overlaid cross axis, or key a system of linkage from one space into another.

Slopes in the piazza floor must be analyzed as to whether they are collective or dispersive in their impact. If collective, do they have an appropriate focus, as in Siena, the classic example? It is important to study the historical forces that have shaped the space as well as the larger natural systems that surround it. Are there views out that connect us to the larger landscape, providing a sense of our place in a region?

Fabric

The category of "Fabric" compels study of the walls that physically enclose the space and the openings in those walls that lead out from or into the neighborhood.

Figure 1. Diagram for Stone and for Comprehensive Piazza Analysis



Fabric: Connections

It is pure delight to analyze the gateways, thresholds and passages that tie a great piazza to the urban tissue surrounding it. First it is important to map the activities just outside the square to understand where people might be coming from. So too we must document the roles of cars, buses, elevators and escalators in helping people to approach. How do they finally enter the space, counting all of the ways there are to get in? How do these entrances differ, be they streets, alleys, tunnels, ramps or stairs? Is the moment of arrival axial and obvious or dramatic, unfolding, and unexpected? How rich is the vertical integration of space, with entrances on different levels feeding down into the center? Some of the strongest thresholds occur across a slight rise, overlooking the inside of the space from the place of contact. Points of entry and exit from major building interiors should also be included in the map of links.

The success of a piazza may also derive from what is not included in it. Is there a major promenade or shopping street just outside, drawing people toward the piazza while preserving the sense of a settled place within? Can cars and buses get close, with measures available to keep them out when that is necessary?

Fabric: Containment

The study of containment begins with drawing elevations on all sides of the space, recording the widths and heights of all the enclosing structures, the number of stories and the openings and surface articulations that determine the scale. Plan drawings can be used to record lot sizes and identify the building types: shop houses with living above, commercial structures, civic and religious buildings. These studies help to discover how, exactly, containment is achieved. What is it that provides the sense of a room, with contributions from the walls, floor and implied ceiling? Like the people in the space, the buildings enclosing it must have a sense of belonging with one another.

Lively piazzas are enclosed by a variety of building types, but it should be possible to identify what ties the place together, bringing unity and harmony to the whole. Color coding of plans and elevations tests the mix of building types and illuminates what percentage should be considered thematic and what percentage are regarded as exceptional. Overall, the surrounding fabric should be of a continuous fine grain, free of large lumps or long, undifferentiated stretches. The detail at street level should be welcoming. Section cuts taken through the edges reveal steps, porticoes, balconies and cornices that strengthen the sense of a sheltering embrace. The material quality of the walls can promote unity through color, texture and patina.

Use

The study of "Use" records human activity in the space through direct and indirect measures.

Use: Patterns

Direct observation and mapping can be used to correlate what people are doing in the space to the particulars of its configuration. As people pass through on a promenade it is important to understand how they choose their route. Preferences can be quantified with record counts of the numbers passing certain points during ten-minute intervals distributed throughout the day.

When they arrive, what variety of uses do people find in the square? The distribution of activities can be plotted by type: cafes, restaurants, shops and a range of services. It should be noted which ones support the daily needs of local inhabitants and which ones cater to the visitor or the special occasion. The most influential uses are those that allow people to linger and socialize. Periodic counts can also be used to reveal the different kinds of users in the space: young versus old, resident versus tourist, those engaged in daily work and those who are at leisure. Are there children at play, and are their parents comfortable with this free activity?

What happens on upper floors is also mapped. Institutional buildings may be institutional at all levels, but an inventory of doorbells can identify if there are residences and or offices above. A balance of uses means people will use the space at different times of days with different purposes. Residences above give "eyes on the street" increasing safety as well as interest.

Background research and repeat visits are needed to appreciate the special events that can be expected in the space: markets, concerts, ceremonies and festivals unique to the story of the place.

Use: Details

Elaboration of the space through the development of critical details gives indirect evidence of recurring behaviors. Edges, boundaries and spatial markers define zones for specific activities: benches arranged for social interaction, broad stairs for sitting or informal perches that offer an overview from a place to the side. What is the quality of the floor itself? Is it clean, elegant and interesting? Has it been enriched with quality materials, paving patterns and meaningful contours? What is there that draws you to the middle, fountains with broad edges or monuments with sitting platforms at the base? Do lamp-posts, kiosks, bollards and containers enrich the "room" as urban furniture? Are the walls adorned with architectural motifs characteristic of the region, a particular type of arch or window surround? Are there, in prominent locations, symbols or memorials that record the history of the place, using sculpture or inscription? Finally, how does the space respond to the seasons? Are there trees and flowers? Do umbrellas and awnings come and go as needed for shelter or shade?

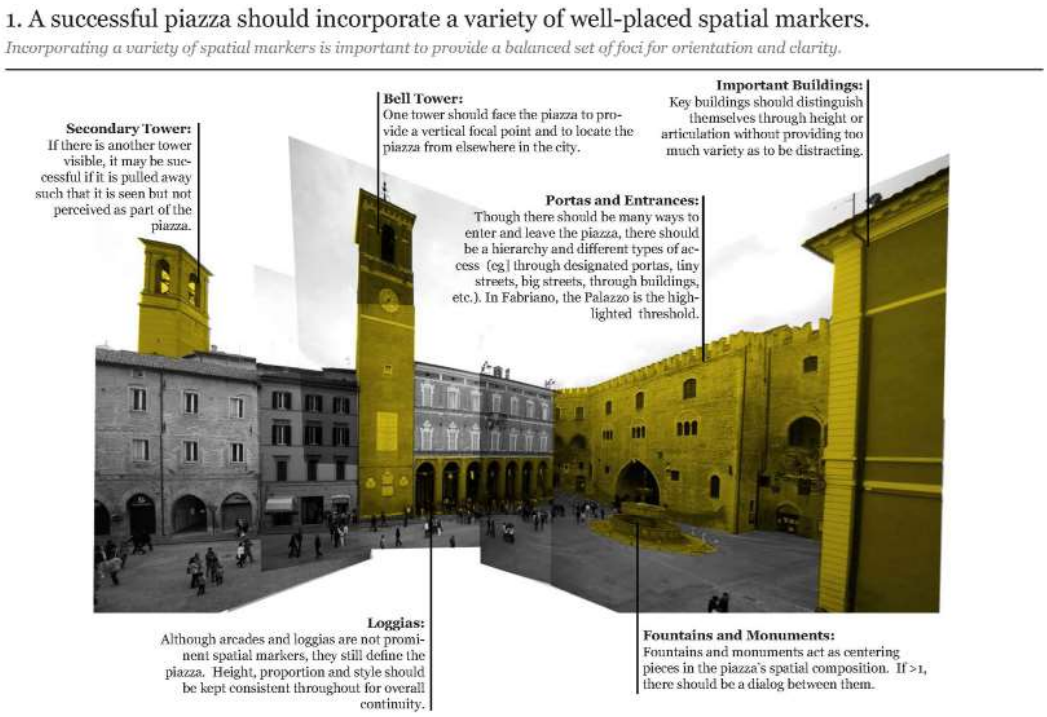
Linkages between poles

Having laid out the component categories for the comprehensive analysis model, it is important to re-state that the goal of these analyses is not to pick apart the various parameters of piazza deign. Rather it is to demonstrate how the component categories interact to produce the unique, multivalent places that we admire. The vignettes that follow explore constructive relationships between adjacent categories in the conceptual diagram.

Form: Dimensions ←→ Fabric: Connections

In Fabriano in the hilly Marche region, the main street flows down in a creased fold in the topography from a city gate at the upper end toward the market district at the lower. The swale flares near the bottom to make the Piazza del Comune, a long trapezoi-

Figure 2. Space dynamics_Fabriano (good:Fabriano)



900 dal shape in front of civic buildings clustered there. The diverging facades, backed up by the rising land behind them, give the piazza a pleasant, enclosing transverse section. At the lower end the Palazzo del Podestà spans directly across the road like a dam acting to contain the space, supported by a large arched vault that allows the street to continue on its way towards the market. The piazza's position in the city and the topography give rise to a delightful set of connections from adjacent parts of the town. The big bishop's palace enfronts one side of the space, backed against a steep hill with the cathedral on top. In a brilliant urban intervention, the back garden of the palace was opened to collect people from in front of the church, bringing them down a vaulted staircase, through the former portone, directly into the heart of the square. Along the opposite face the Loggiato San Francesco was built, offering people from that side of the swale easy access to a sheltered promenade overlooking from the second level. Shops and cafes are found in the vaulted spaces underneath, at piazza level. Dimensions – shape and section - and connections interconnect.

Form: Dynamics ←→ Use: Patterns

The Piazza del Campo in Siena shares many defining principles with Fabriano, but there executed on a greater scale. The famous shell shaped space sits one block below the curving spine of the city, the Francigena road. A wealth of connections feed down into the piazza. As in Fabriano, the major civic building holds the space at the lower end, this time with the clock tower directly alongside to create an even stronger focus. With the broad, theatrical bowl facing the Palazzo Pubblico, the spatial dynamics in Siena are so strong that they prefigure the patterns of use. There is a continuous promenade at the upper rim, passing in front of tourist oriented cafes and restaurants. Those who are really trying to get somewhere use the straight route across the bottom. The half bowl at the center gives out unmistakable cues that one should come in and sit down, facing front to the focus. So the visitors do, much as if they were at the beach and mesmerized by the sea. From the shaded comfort of the rim, the opportunity for an overview is compelling. Activity is driven by the iconic shape of the floor, articulated though all of its memorable details.

Figure 3. Patterns of use map_Vicenza

Use: Details ←→ Fabric: Containment

Vicenza boasts one of the most beautiful central squares in the world, with one long edge dominated by the incomparable Basilica Palladiana. The buildings facing it are equally distinguished in a supporting role. The beauty of these landmarks notwithstanding, the real charm of the space comes from looking down toward the end where a fine grain of traditional shop houses is seen through the screen of two giant commemorative columns. The narrow buildings at the back retain their colorful facades topped by an irregular roofline. Given shorter floor to floor heights, there is a riot of window openings with endlessly varying hints of activity behind them: balcony rails, flower boxes, shutters that are open and shutters that are closed. The two big columns are of a warm white stone with statues above the capitals and seating around the base. They catch a changing slant of the sun over the course of a day. One side of this screen is civic space and the other appropriate for a profusion of café tables and chairs as soon as the weather allows.

Pedagogy

Applying this model to teaching, we lead a group of students through a series of classic piazzas. They are divided into six teams of two or three corresponding to the six subcategories. After making a series of basic drawings to get an overview, they annotate and supplement these drawings to gather insights into their specific domains of responsibility. We ask each team to develop a series of assertions in the general form, "A successful piazza must…." These assertions are supported by their observation and recording of the sites visited. Once we reach our studio base, they compile the evidence and share their hypotheses with the whole group. In the second phase of the program new teams are formed, and each team travels out to make a holistic analysis of a single piazza using all of the measures that apply.

Examples of student hypotheses are the following:
"A high ratio of plan enclosure supports a good piazza: 80% plus in plan. In section,

Figure 4. Patterns of use_Roma (A good piazza... Hosts mixed uses and activities)

the ratios can be more varied. If piazzas had enclosure in the 1:2 range in at least one direction, they felt adequately enclosed." (2011)

"A good piazza is composed of focal points, strategic placement of major buildings and alignments to create an experience that draws users in and encourages them to stay." (2014) (Figure 2)

"A good piazza should have defined entrances with a strong sense of threshold and a rich diversity of entrance types: gateway, chute, canyon, even a gap, if it is not too big." (2013)

"A good piazza has enough enclosure to be a room, contained by walls, a ceiling and a floor." (2013)

"A great piazza hosts diverse people & activities."(2015) (Figure 3 and figure 4).

"The details of a piazza are important, because they provide access to history, complexity of space, community identity, environmental interaction and boundaries." (2015)

Conclusion

What benefits might accrue from this type of comprehensive analysis? First, in Italy there is an evident desire to make new places of community that sustain these values, but many of the recent efforts are not working. They omit critical ingredients.

In Villa Potenza, just north of Macerata, there is a modest attempt to make a new center that has been an easily foreseeable failure. It is part of a commercial development at a density that is, for Italy, no more than suburban. The ground is dead flat, former agricultural land that was ripe for exploitation, but offered no clues, no traces either historical or topographical, that give the place character. The space is bounded largely by single story retail structures with terrace housing units nearby. The classic typology of the shop house has not been explored. The sense of enclosure and the intensity of activity are just not there.

In nearby Trodica there is a more determined effort. There are shops behind continu-

ous porticoes with two stories of housing above. This is certainly better, but not enough. An effort to integrate cars has lead to street dimensions that are simply too large. The section ratios (height to width) are low and the spaces leak out of every corner. There is a large new church to anchor the development, but rather than directly enfronting the intended piazza, it sits alone, at a distance, surrounded by a large margin of incomplete green space.

In Venice, on Giudecca island, there is a more sophisticated urban redevelopment located in the former Junghans industrial district. Weaving together new buildings, existing structures, canals and bridges, there are plenty of spatial cues. Nevertheless, the intended commercial center has remained underutilized for years. The space itself is too large and has a difficult shape. Only a small percentage of the enveloping fabric is capable of supporting activity. There is a handsome Liberty style school along one edge that has been programmed for multiple uses, but the critical entrances are on the opposite side, logically facing a canal. The entire ensemble is simply too far from the major routes of pedestrian travel, those being found along the fondamenta of the Giudecca canal where boats stop to deliver people coming from the rest of the city. Also in Venice the highly regarded Saffa development in Cannaregio has a vacant commercial center. The space is well formed and the buildings are a very interesting twentieth century interpretation of traditional Venetian typologies. Again, they are simply too far from the true center of life in the neighborhood along the edges of the Cannaregio canal.

Just outside of Florence, at Scandicci, there is a new town center anchored by a tram stop that offers easy connection to and from the urban core. The transit station has been combined with a piazza, retail spaces, housing, offices and multipurpose venues, indoors and out, to serve the community. The pieces do not come together. Although the rail line runs flush with the ground, the station stop presents a major barrier between the majority of the shop fronts and the piazza. The elevated civic room and the head of the square have only three commercial spaces underneath it: a bank, a bookstore and a café. Confoundingly, these spaces are set back behind a tall glass foyer that has little else to contribute. One might expect to find a strong vertical connection to the civic room above, but those connections are removed to the lift towers and exterior stairs at the ends of the building.

It is difficult to get these new spaces right even as they are embedded in a culture that anticipates their presence and has experience with their use. The designs simply have to get better, drawing from a comprehensive reading of the historical antecedents.

If new piazzas are a challenge in Italy, they are a much greater challenge in other cultures not predisposed to the form. A solid base of comparative analysis is especially important when working on new frontiers. The potential benefits of lively urban spaces are many, too many for us not to try to learn from the best Italian examples and to apply those lessons to the making of place in our own communities. Settled forms of everyday urbanism can enrich the lives of city dwellers who every day grow in number.

Finally, a comprehensive study of the piazza returns benefits that go far beyond the literal replication of the prototype. Engaging in the process of these studies helps future architects to appreciate what it takes to achieve a profound sense of space and place. From these models, we can aspire to make places in which the formal, material and behavioral aspects of design are brought together to become indivisible attributes of the whole.

References

Bacon, E. (1974) *The Design of Cities* (Viking Press New York).
Childs, M. (2006) *Squares*. (University of New Mexico Press, New Mexico).
Cullen, G. (1975) *Townscape*, London.
Fusch, R.(1984) "The Piazza in Italian Urban Morphology," *Geographical Review*, Vol. 84.
Graves, C. (2009) The Geneaology of Cities. Kent (Kent State University Press, Ohio).
Lennard, H., Crowhurst, S. (2008) *Genius of the European Square*. Carmel, CA (Gondolier Press).

Mandolesi, E., Ferrero A. (2001) *Piazze del Piceno*. Scuola di Architettura e Design, Ascoli Piceno (Gangemi Editore)
Moughtin. C. (1999) *Urban Design: Street and Square* (Architectural Press, Boston).
Pederson, M. (2011) "Leed ND, Public Outdoor Space and Aristotle," and "Piazze of Italy; a Survey of Archetypical Examples," unpublished masters thesis draft, Huxley College of the Environment, Department of Geography, Western Washington University, January 5, 2012 and September 24.
Sitte, C. (1965) *City Planning According to Artistic Principles* (1889). London (New York: Random House).
Smith, G.E. K. (1956) *Italy Builds*. (Architectural Press).
Wolfrum, S. (2014) ed. *Squares*. Basel, Switzerland: Birkhauser.
Zucker, P. (1959) *Town and Square* (Columbia University Press, New York).

A metropolitan region, a river and two cities: public space as a solution – Vila Nova de Gaia and Porto

Diana Almeida Silva
Faculty of Architecture, University of Lisbon, PHD Urbanism
Keywords: public space, Porto, Gaia, urban policies, harbour cities

Abstract

In the last forty years, the metropolization process and the extensive urban growth in the region of Porto, in Portugal, produced divergent effects on the cities of Porto and Vila Nova de Gaia, placed on each bank of Douro´s river mouth. Despite the same territorial land condition and sharing a geographical unity, different urban dynamics created functional asymmetries, where Vila Nova de Gaia demographic occupancy and construction levels outperformed Porto - the regional capital city.

This study focuses on the differences between contemporary public policies that designed public space, considering the isolated urban agendas promoted by each municipality. Despite the urban migration dynamics that support their mutual existence, the analysis of public space remains essential to understand the political, economic and social conflicts between Porto and Vila Nova de Gaia.

Evaluating the existing public spaces in each city, regarding housing programs, commercial areas or road structure, mainly supported by national and local planning regulations, is an opportunity to understand public space as an urban and territorial qualification system, beyond the administrative domains. Considering the functional relationship between the two cities with high urbanization rates, but divergent public space contexts, appears fundamental to create a whole and effective region public space strategy.

The city as public space introduces another urban planning paradigm, tested within creative solutions by recent public urban policies that assumed the importance of territorial cohesion. Those results of public space planning could be a productive example to the relationship between one canonical city and one that never was.

Introduction

Vila Nova de Gaia is the southern neighbour city of Porto, the North Portugal major city, facing Douro River´s mouth. Despite the geographical unity of its central areas, different urban dynamics created functional and formal asymmetries on each of the neighbouring city. In the last forty years, Vila Nova de Gaia demographic occupancy and construction levels outperformed Porto.

The presented approach is related to a larger investigation on public space considering Vila Nova de Gaia municipality, focusing urban morphology, urban regulatory framework and management urban policies. The study of urban form is particularly relevant in the central historic area, where the two cities have an individual origin and urban form. The urban evolution processes that will be presented focus ARU area. This area corresponds to an ancient valley where an economic relationship between these cities and the world took place (Silva, 2005) on the early stages of an industrial era. Here, two empires disputed and sponsored a singular commercial trade process related to Porto wine (Temudo, 2005).

The morphological studies of the two city centers have made clear the role of public space in the history of urban planning process. On the other hand, the urban plan is an important mean to perform new functional relations on a metropolitan region with high urbanization rates but inefficient public spaces.

In order to support this statement, the understanding of the historic phases of the two cities is determinant. This historic observation supports on the relation of Conzen (Whitehand, 2001) the concepts of town plan, building fabric and land use, focusing on the river margins and its physical connections which promoted urban evolution on both sides. This relation shows how a morphological period corresponds to different urban forms in Vila Nova de Gaia and Porto, and how morphology could establish new urban plan principles on planned connections.

Porto integrated morphological analysis in the last municipal operative plans (Oliveira, 2014), transforming the methodological process of conceiving urban areas not only by use or occupancy. On the other hand, Vila Nova de Gaia officially introduced urban planning only after 1949. Till now this city constituted an important social and economic urban support on the metropolitan region, being the most populated municipality in the northern Portugal. However its urban form study is a recent process, as urban plan interventions became an important issue in both central areas.

Almost twenty years after Porto center area became World Heritage, Vila Nova de Gaia claim the full integration of the wine warehouses area understanding the unique historically based situation and the urban form of this areas that results of the same context. The two margins should be considered as part of the same territorial system that promotes urban cohesion in a regional context. Here, different urban areas could be complementary to others with different formal skills. One of these urban areas is the historic center where land use ownership struggles against renewal strategies compromises future economic relations. New possible public spaces could include housing functions and hold local population as a main solution similarly to others harbor cities.

Methodology

In order to perform an urban form analysis in Vila Nova de Gaia the cartographic elements and urban plans were considered, selecting the ones that set physical significant differences. This analysis focuses on the information of urban fabric and historic descriptions, as well as archive information. It is actually possible to propose both cities centers as unique morphological region. Similar analyses have been made in urban morphology field (Oliveira, 2013), (Coelho, 2013), (Coelho, 2014).

The case study area is limited to the Porto and Vila Nova de Gaia watersheds, between the two last river bridges. This specific area corresponds to a collective space of water front that expresses the last concerns about metropolitan urban regions (Polis, 2001), (Dungar et all, 2014). Although this presentation shows only a part of a huge

municipality, a territorial approach is not dismissed. Other authors results concerned to urban evolution of Porto and neighboring cities were considered, such as Pereira and Tenreiro (2013), Oliveira (2013) and Fernandes (2005).

Vila Nova de Gaia river margin is shown on the first topographic plans of Porto (the topographic plans of 1839, 1892 and 1903). However, it was difficult to find cartographic elements of entire municipality before 1948, with morphological elements and information that could be used to define a comprehensive lecture of Vila Nova de Gaia urban fabric evolution. Within last thirty years, this was one of the main problems that urban planners and local authorities faced. Since 1984, Vila Nova de Gaia was categorized as a self-governing city, and some historic analyses express several urban transformations, specially these related to industrial improvements (Pacheco, 2013), (Guimarães, 1997) and wine trade (Pereira, 2008), (Gaspar, 2005), (Ravina, 2002). To accomplish a deep perspective on public space evolution older maps of Porto and three maps of Vila Nova de Gaia, corresponding to three different years 1948, 1975 and 1997, were observed. According to these, public space spots were isolated and an evolution between Porto and Vila Nova de Gaia, specifically in historic renewal areas could be compared.

Forming Process

The recent territorial recognition consists on a planning process that contributed to enlighten urban transformations in Vila Nova de Gaia. The urban form evolution of the valley result of two important ground features – geography and land division. The cultural factors like resources exploration and administrative organization also played an important role. Inside geographical features, climate and orography were determinant to set defensive and commercial areas. Located in the highest points of both margins and near to the ocean, these two spots developed in the closest space of the river. This is a mirrored situation in both sides of the Douro´s River, creating two naturally protected observation spots that corresponded to the castle settlement and the Porto religious center. Both upper spots are at the same geographic level. Vila Nova was the name of the lower margin and Gaia was the name of the political upper center. The two protected valleys, where the river is constricted by relief, allowed the setting of commercial ports. Only in the beginning of 19th century a permanent bridge was constructed, avoiding transportations by boat.

The land relief constituted the first factor to induce major paths at the highest ridges and agricultural plain areas at south of Douro´s River banks. The highway was built in the middle of 20th century, in the same location of the ancient road that followed the geographic form.

There are evidences of commercial activities related to metal exploration in Douro´s River since before 2nd century BC, as mentioned by Strabo (1st BC-1st AC), Pliny the Elder (1st AC) and Pomponius Mela (1st AC). During Roman Empire this region was organized and several roads were stablished between different important castra and cities, from south to north, closer to coastline, crossing the river in this tight area. An important road from Lisbon and Coimbra ended at Vila Nova.

In the first millennium, Vila Nova de Gaia was the border of Christian and Islamic states. Gaia became an autonomous municipality with its first foral at 1255. At 1383, with an administrative and clerical reorganization, the castle was destroyed and Porto became the religious center. Gaia was directly governed by realm jurisdiction.

After Portugal and England established the oldest diplomatic alliance in the world, Treaty of Windsor, at 1386, the mercantile process contributed to expand Porto region as an European economic center, transforming land occupancy outside the city walls. From 1756, Vila Nova grew up as result of governmental laws that defined this as an ultimate control point of wine commercialization path. The physical relation between lower margins became essential to increment economic benefits. Specifically after the river margins have been a battlefield during Napoleonic invasions and when the liberal constitution was been established here.

At the final 18th century Vila Nova was a central wine harbor and more warehouses were built, brought out by the fact that there were no city walls as the ones in Porto. One of the most important trade products is the Porto wine. This product was produced in the

interior Douro´s watersheds and transported to Vila Nova, where the wine warehouses were implanted. As a result of specific climate in this particular area of the river, wine warehouses type, with 10 meters high open space, conserve the natural air, temperature and moisture conditions to preserve and obtain the best Porto wine products. It's important to notice that the particular dimension of a single cask was the metric rule that organized typologically the urban form. Originally, wine warehouses were closer to the river and designed to receive and preserve casks, occupying the plot horizontally. So, the right to stablish bigger plotting areas was related to the producer's capacity and benchmark wealth. Lengthwise buildings were constructed to get the largest span, including central corridors and one or two storage lines of casks. This is a unique condition that represents the relation between use, natural land form and urban form, resulting together from a specific process of storage – the wine cask measure and weight. As the form of the casks defined the form of the storage, buildings were defined exclusively by this function, disregarding a public space arrangement on the urban morphology.

This economic activity was the main factor for urban development until the beginning of 19th century, at Vila Nova and Porto. More than 80% of the constructions in the valley are warehouses and almost totally related to Porto wine storage. Mostly detained by English families, England territories represented the prime target market. Therefore, English traders structured the physiology of the Porto wine and the commercial activities related to. On Porto margin were established office services, financial houses and housing buildings.

At the end of 19th century, both river margins were differently occupied in this central area, and crossing the river was a government matter. Both north and south periphery territories started to be occupied, featured by bourgeois houses, new industrial facilities and unqualified worker housing areas. Soon, railway forced the planning to overpass the river at an upper level. During fifteen years the train stopped only at Estação das Devesas, at Vila Nova de Gaia. Commercial transportation was made by a sloping street. As Queiroz (2009:136) pointed, Vila Nova developed as a functional extension of Porto, individually from Gaia. Both constituted isolated spots in the same margin but with few connections among. Some public streets were improperly occupied by warehouses as soon as the available space was occupied to support a superior storage capacity. At 1798, 400 thousands hectolitres were exported (Ravina, 2002: 240). At 1984, two millions hectolitres could be deposited in the existing warehouses (Pereira, 2008: 178).

According to the modern concept of hygienist urbanism, Vila Nova de Gaia changed progressively from an ancient urban morphology to an international industrial center. Large private plots, owned by the bourgeoisie, were fully occupied by the closed warehouses, without openings on the facades, accessed by thin streets. At the upper unoccupied area, near Serra do Pilar, new larger streets were promoted. This allowed a faster interaction between the two commercial areas. Concluded in 1537, an ancient street previously connected Vila Nova to the Serra do Pilar Monastery. In Porto, the connection between Praça da Ribeira and the new Praça D. Pedro IV, Avenida Mouzinho da Silveira was inaugurated only fifteen years after Avenida General Torres, at Vila Nova de Gaia.

At the end of the 19th century, Porto was in advanced urbanization process with structural main streets that supported occidental expansion, as the case of Avenida da Boavista. As soon as Ponte Luis I was inaugurated, several plans were developed to Porto´s lower and upper areas. At that time Porto was the European capital with the biggest ratio of automobile vehicles. The first industrialization process contributed, as in many European cities, to establish planned growing areas. At west Porto the international seaport area was planned. Instead, at Vila Nova de Gaia, linear housing and industrial constructions were aligned with main regional roads and the railway. At the east hillside, many industries were founded, related to commercial activities like commercial broadsheets, casks fabrication and metal industry (Guimarães, 1997).

Although Vila Nova de Gaia urban form shows a programme development of 19th century, no global urban plan was designed. Under older streets basic infrastructures were introduced. New others streets were designed over medieval plots. A functional public space was negotiated with owners as the use of automobile got determinant. The new urban plans designed a simple land division of the urban farms in several individual plots without a main

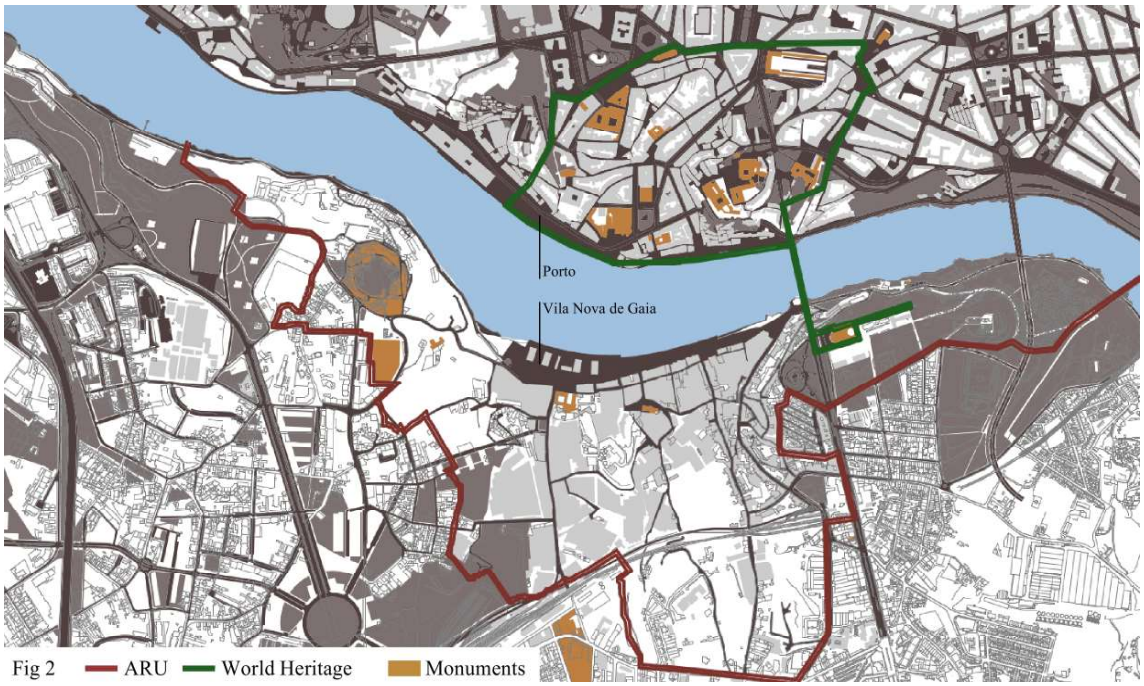
Figure 1. Urban evolution scheme of Porto and Vila Nova de Gaia cities. The two last schemes are based on cartographic data from 1839 and 1903.
(Diana Silva design)

public street. Two significant housing areas were defined by an orthogonal grid and individual straight plots – Serra do Pilar and Devesas - Candal, at the upper level. Some streets were inaugurated within the same morphological principle. The physical relation between the lower and upper city was compromised because of irregular tied streets, adapting to the relief, contrary to Porto, which designed and constructed a new path scale of extended streets. In this north margin, commercial offices and housing corresponded to the main land use. In south margin, industrial and storage activities fulfilled the ancient valley and destroyed at least one important medieval street on Vila Nova and Gaia.

Until the forties, Vila Nova de Gaia established some public equipment. The main avenue was concluded as soon as electric tram rail was fixed changing natural relief in both upper areas – Avenida Campos Henriques. This new public space was a privileged area since the beginning of 20th century. Only two public areas were properly designed as formal public romantic gardens until then – Jardim do Morro and Jardim Soares dos Reis. The new town hall was built in this new area and at 1925 was inaugurated.

During the 20th century Porto had some different urban plans which contributed to create several new areas. On the other hand, Vila Nova de Gaia promoted several isolated housing plans, entrusted to a generation of modern architects, including the ones that worked at Porto, applying Athens Charter modern principles. At midd-20th century it is possible to identify the differences between both urban peripheries. In the late seventies, Vila Nova de

Figure 2. Actual World Heritage delineation area. Porto and Vila Nova de Gaia historic center areas. (Diana Silva design)



Gaia construction areas doubled as population grew up three times. More than 50% of the existing urban form was built in the last four decades.

As soon as both ancient center areas became uninhabited Porto promoted building renewal and mixed uses. Like other European harbour cities (Dundar, 2014), both historic cores became a common problem, related to abandoned central areas and an overaged urban morphology. Here, a medieval grid and the first generation of industrial streets persisted. Porto historic center reported an aged and unemployed population and a loss of more than 55% of inhabitants within fifty years. At 2006, 70% of the Vila Nova de Gaia warehouses were neglected despite the efforts that were being made since 1984, when urban planning studies of historic center started. Two facts reduced commercial rank of Vila Nova de Gaia – new trade laws that discharged the exclusivity, at 1986. At 1971, a massive fire that destroyed more than a half of the buildings and part of wine production.

Since 2001, Vila Nova de Gaia historic area has been studied in order to perform several functional and economical strategies which contributed to transform the relations between both margins and new areas inside this city and Porto. How to promote urban policies in such different morphologic areas in Porto and Vila Nova de Gaia? How to define a new public space system in such historic areas where land use is monopolized by few owners? How to introduce formal adaptations of wine warehouse typology? How to define urban interventions in margins with different land use?

In response to this reality, local urban planners proposed public space infrastructures as a solution of functional cohesion, establishing relations between different isolated areas. One of the most recognisable is the waterfront that begins before the Eastern Douro road bridge and finishes at Espinho, the South neighbouring city. This waterfront connects with other streets and internal roads that previously served housing areas at upper levels. Defining a continuous connection from east to west at Vila Nova de Gaia, this public space had born hundred years after Porto started to plan its first public waterfront at Foz Velha - Passeio Alegre.

Through the legal classification and political agreements, almost forty hectares of this valley and margin were the spotlight of interventions. Public space system was a fundamental concept developed not only concerning this area, named as Critical Area of Urban Re-

Figure 3. Porto and Vila Nova de Gaia historic center areas, at May 2015.
(Diana Silva photography)

newal and Regeneration, but with entire municipality. 33 million euros were invested promoting public space physic expansion and new other connections from the river mouth margin. Four miles of water front were planned and constructed over illegal constructions. These urban policies determined a new historic period of public investments in unplanned and overcrowded urban councils. The sky-lift and the sub-way at the upper area as well as other have been built and proposals to the river crossing and three new bridges at the lower level are considered as a future solution to establish connections with Porto. In this case, the relation with Porto is an important mean to keep a unique area fully functional. These two valleys, including seventeen categorized historic buildings at Vila Nova de Gaia and fifty eight monuments at Porto historic center, are considered one of the largest wine warehouses in the world. To solve both urban problems and touristic demand needs it´s crucial to improve public space security, fire security (Almeida, 2010), economic diversity and local housing quality of. Second, it will have to promote building renewal and establish old streets that were blocked by wine warehouses. This last action corresponds to a mandatory need of strategic connections between the different geographic levels, crossing the valley on a same level from east to west. Establishing parallel streets to the river margin will perform alternative public spaces that could serve the less visited historic industries, villas and local museums placed at upper levels. A relation between lower and upper areas is determinant to promote circulation at different levels among the two cities, as the local economy got more prosperous every time those connections were enforced.

In order to propose a public space as a solution is a determining factor to recognize a particular urban form that have origins on a unique land use in the world. This industrial frame was developed based on technical carriage and storage process of Port wine, through a maritime gateway and under protective trade laws. Similar areas could be identified in the world as those mentioned by Pacheco (2013) or Ravina (2002) such as Bordeaux, Chianti and Cádiz that became part of a global history of industrial expansion. In those cases, harbour areas corresponded to the most modern government infrastructures controlled by public authorities but used by economic elites. These upper class promoters funded land use transformation and stimulated substantial constructions in each location during the last three centuries. Wine production maintained this urban condition and several financial, industrial, administrative services that supported commercial trade. Actually, the neoclassic public space pattern allows other uses at Port of the Moon, at Bordeaux. Vila Nova de Gaia has a different percentage public space in the warehouse valley and a natural topography that limits the relation with other more recent expansion urban areas. Urban pattern conflicts with functional adaptations of the plots and public space is monopolized and almost exclusively used by wine traders.

Conclusion

The recent study of Portuguese cities urban form shows in what way urban origins are related to a building typology and a produced type of public space. In the presented case of Vila Nova de Gaia, morphology was a part of the general urban plan reviews, considering different occupied areas and a flexible intervention that could offer urban structure to those areas. However, local geography and late public interventions contributed to recognize a context that resulted from a south margin city that developed within an economic dependency context. A similar relation stands on the case of Barcelos and Barcelinhos Portuguese cities river banks.

Until the last decades of 19th century, corresponding to the late monarchic period (Oliveira, 2012: 180), it is possible to identify the construction of main basic infrastructures in central upper level and two alternative streets that connected this level to the river margin. Big farms ownership destroyed ancient thin streets but some public equipment was built such as graveyards and the sea marketplace at Diogo Leite Avenue. An urban evolution was promoted by seaport phenomena, contributing to industry implementation and financial activities.

At the begging of 20th century, the Republican period brought to Porto the second urban planning generation. After the first Douro´s road bridge, Vila Nova de Gaia developed some

new streets and three road intersections became important civic areas, related to a bourgeois population that occupied new upper areas. The Republic Avenue was planned by this time, but only concluded at 1934.

During the lengthy dictatorial period, as Porto presented new expansion urban plans, Vila Nova de Gaia was considered as a secondary margin. It's important to refer the Giovanni Muzio designed urban plan related to Afurada place, proposing a modern structure that connected the ancient valley and the ocean. Through an axial street the residential areas were centralized. This street intersected the future national road which crossed the Douro River at Ponte da Arrábida. Here, modern urban principles predicted the future urban expansion location. At the same time, Porto predicted expansion urban plans designed by Fernando Távora, Antão Garret and Arménio Losa. Until 21st century, none of these urban plans were considered in Vila Nova de Gaia.

Nowadays, on a Democratic period, Vila Nova de Gaia urban plan it is based in a recent study of land use and ownership negotiations. Contrary to Porto, where large extents of land were planned at which period, Vila Nova de Gaia presents a different urban form that is essential to be distinguished where intensive exclusive uses reflected a repeatedly used typology.

Rephrasing Portas (2003) collective urban spaces contribute to urban cohesion and its old permanence is an important mean of continuity while profound morphologic transformations could take place. To understand this city as an organism, public space is a key to consider required future space connections. From this point, urban policies should dedicate public investments on territorial connections and on alternative cruiser transportation. As a greater example, this historic valley is a new important public space that had been slightly rescued from the past and included on a dynamic urban area. The valley became related to the city by a continuous waterfront (Polis, 2001). Economic relations are improved since physical relations contribute to new interactions between upper and lower margins. These new relations are a mean of metropolitan development as different functional areas became accessible components in a public space system. This public space system allows that each heritage area, which is under different territorial law jurisdiction, could be integrated and observed. Today both historic center areas shouldn´t be analysed separately either as a glazed urban form that could not be part of functional adaptations. This is a unique morphology that represents the results of urban dynamics. These relations could contribute to share public services and public equipment that belongs to the same metropolitan region, even if different historical contexts created a different urban form in each valley. At Vila Nova de Gaia, other urban areas are under examination as urban renewal was extended in a territorial perspective. Specific legal mechanisms were engaged to define public space connections and qualify inhabited areas with this valley.

Promoting new world heritage delineation implies to reinforce the historic vision of both places and qualify public space connections related to those. For this, small confined interventions on each public street contribute to inner security. However, these public investments constitute minor criteria and became inefficient to face a larger subject on urban policies that should alarm local owners and both public authorities.

References

Almeida, S. (2010) "Centro histórico de Vila Nova de Gaia – Vulnerabilidade ao risco de incêndio. Contributos para um plano de intervenção dos bombeiros" in *II Congresso Internacional de Riscos, Maio 2010* (CMVNG – Direcção Municipal de Bombeiros e Protecção Civil).
Coelho, C. (2014) "O tempo e a forma. Cadernos de morfologia urbana. Estudos da cidade Portuguesa" (Argumentum, Lisboa).
Coelho, C. (2013) "Os elementos urbanos. Cadernos de morfologia urbana. Estudos da cidade Portuguesa" (Argumentum, Lisboa).
Dundar, S.G. et al (2014) "New faces of harbor cities" (Cambridge Scholars Publishing, Cambridge).
Fernandes, M. G. (2005) "Urbanismo e morfologia urbana no norte de Portugal" (FAUP publicações, Porto).
Gaspar, M.P. (2005) "O vinho do Porto: entre o artesanato e a agroindústria", in *História, Revista da Faculdade de Letras, III série, vol. 6* (Porto) 185-191.
Guimarães, G." O pólo industrial da Serra do Pilar" (http://ler.letras.up.pt/uploads/ficheiros/5292.pdf.) accessed 10 May 2015.
Oliveira, V.M.A. (2013) "A Evolução das formas urbanas de Lisboa e do Porto nos séculos XIX e XX" (U. Porto Editorial, Porto).
Pacheco, H. (2013) "Porto e gaia são faces de uma só moeda" in *Informação Municipal nº65 da Câmara Municipal de Vila Nova de Gaia* (Vila Nova de Gaia) 12-15.
Pereira, M. A. (2008) "As Arquitecturas do vinho de um porto monofuncional" in *História, Revista da Faculdade de Letras, III série, vol. 9* (Porto) 169-192.
Pereira, R. R., Tenreiro, J. P. (2013) "Arquitectura, cidade e sociedade - O Porto desde 1900" (Universidade Popular do Porto, Porto).
Polis, Programa (2001) "Viver Vila Nova de Gaia" (CMVNG, MAOT, Edição Programa Polis, Lisboa).
Portas, Nuno; Domingues, Álvaro; Cabral, João (2003) "Políticas Urbanas - Tendências, estratégias e oportunidades" (Fundação Calouste Gulbenkian, Lisboa).
Queiroz, F. and Portela, A.M. (2009) "Conservação urbana e territorial integrada. Reflexões sobre salvaguarda, reabilitação e gestão de centro históricos em Portugal" (Livros Horizonte, Lisboa).
Ravina, A. G. (2002) "El vino e los puertos de la Europa Atlántica: Burdeos e Oporto (siglos XVIII a XIX)", in Douro – *Estudos e Documentos*, vol. VII (14) 237-255
Silva, F. R. (2005) " Os ingleses a as circunstâncias políticas do negócio dos vinhos do Porto (1756-1800)", in *O vinho do Porto em Gaia e companhia* (Edições Afrontamento, Porto) 111-126.
Temudo, A. P. (2005) "Os ingleses e o vinho em Vila Nova de Gaia", in *O vinho do Porto em Gaia e companhia* (Edições Afrontamento, Porto) 127-140.
Whitehand, J. W. R. (2001) "British urban morphology: the Coezenian tradition" (School of Geography and Environmental Sciences, University of Birmingham, UK).

Defining Street boundaries

Alice Vialard
College of Architecture, Georgia Institute of Technology, 245 4th St. NW, Atlanta, GA., 30332-0155, Department of Architecture, American University of Sharjah
Keywords : street morphology, public space, frontage

Abstract

In small settlements such as hamlets, streets and public space are often undistinguishable. Many French villages have started with no clear boundary between public open spaces and streets. While the evolution of planned French cities has been discussed (Lavedan 1952), this paper focuses on open space that has evolved into streets defined with clear vertical boundaries (Anderson 1986) and is later enhanced by distinctive horizontal boundaries. Based on both Napoleonian and current cadasters, the evolution of the street morphology is analyzed to address the different types of boundaries that drive the street experience. The publically accessible open space of 17 small towns and 18 villages or small French settlements is analyzed as a system of open spaces (Hilllier & Hanson 1984, Batty 2001) and as a street network (Peponis, Bafna & al 2008). The analysis highlights a first set of transformations that emulates Haussmanns transformations of Paris by redefining the vertical street boundary (alignment and widening) and by adding new ones. These transformations impact the syntactic structure of the settlement, usually bringing higher integration, visibility and a shift of the core. The second set of transformation that leads to the 21st century street results from a series of changes on the horizontal plane (sidewalk, crosswalk, paving, etc.). These change in materiality are not just subtle design changes, they play a deterministic role on the accessibility of the public space. It leads to question certain modes of representations of the streets such as axial map, isovist, property boundaries, and street centerline, which embed only some aspects of the boundaries that privileges either the pedestrian experience or the movement of the car.

Introduction

The public space is often assimilated to the public square and its precincts which exclude the space of the street. This distinction of public squares from streets in the public space is the sign of a long debate as whether the street is planned as an axis that bounds and defines the urban block, or whether the space of the street is the result of an accretion process. According to Martin (1972), many cities result from an organic growth by accretion, while others exist by first establishing a street network. In the case of French towns, both processes exist, but the former remains dominant and will be the object of study.

Using French settlements of various sizes, this paper seeks to understand the transformation of public space and its boundaries that occurred over a period of two centuries, clarifying the mechanisms of changes from a morphological and a syntactical perspective. The mechanisms of growth in French towns highlight two points: the evolution of the morphology of the public space, and how it functions, as well as the role of street as generative or as element of rationalization.

Descriptive statistics are presented to highlight the changes between two periods: the state of a settlement at the time of the Napoleonic survey and the current state. This comparison aims at clarifying the relationship of the morphological and syntactical variables within the transformation of the public space. Results support the argument that the growth of urban settlements is tuned towards the increase of public space that occurs with first a rationalization of its layout. Moreover the rationalization does not occurred by global planning but rather by local interventions. Such local scale of intervention impacts the larger syntactical structure of towns and the divide between public squares and streets grows larger.

In general, the public space of cities can be interpreted as the open space of a deformed grid: deformed in two-dimensions – a series of continuous convex spaces - and in one-dimension – an axial map (Hillier, 1989). The first representation is sensitive to the boundary of the public space. The axial representation links these convex spaces with a linear element, the axial map represents the urban experience as a deformed grid. Lately this interpretation of the public space, reflecting the use of space, is challenged by the current practice of designing street. A comparison of an axial map and a street centerline map shows similar syntactic properties (Turner, 2007). However, the shift from axial to centerline representation implies different modes of use of the public space, a different perception of the street element: a pedestrian experience versus a vehicular one.

The impact of the vehicular movement on the public space founds some precedents in modern urbanism. Posing as a critic of the modern fabric, Levy (1999) makes a distinction between open space and street, and considers them as two different primary elements constitutive of the urban fabric. Indeed, modernists argued for the independence of the street system which tends to produce undifferentiated open spaces. In opposition, a traditional street functions both as link and as place with vertical walls (Caliandro, 1978; Ellis, 1978). This paper links the vertical walls of the streets, represented by the parcels boundaries adjacent to any public space, the axial representation of the public space and finally its centerline representation.

Napoleonic cadaster

One of the first definition of street, la rue in French, is associated with the presence of buildings on the edge of an open space: "*a way bounded by houses in an agglomeration*"[1]. The boundaries of the private space are what define the street and differentiate it from a road which exists independently of any buildings. The place of building in defining the street is already present in the first attempt to officially regulate the urban public space which concerns the vertical facades. The policies of the Grand Voyer, position created by a royal ordinance in 1270, are mostly involved with the security of "ways". Sully appointed Grand Voyer by Henri IV, has for duties to regulate the

[1]Author's translation of "*voie bordée de maisons dans une agglomération*».

"frontage" by prohibiting cantilevered objects on facades for the safety of pedestrians. [2] Such policies are not systematically implemented, and each city tends to follow its own regulation. The first official and systematic survey of the territory of France is implemented under the leadership of Napoleon with the Act of 15 September 1807 that launches the *cadastre*, completed in 1850 (Block, 1891)[3]. The survey of the whole country serves primarily for tax purposes but it also becomes a support for planning changes.

The development of the cadaster happens in a context of important changes in the city fabric. In the late 18th and early 19th centuries, all over France, the walls surrounding the center of towns are slowly dismantled and replaced by boulevards which emerge as much as a street than a public square. Under the impulse of local decisions to improve sanitary conditions, municipalities start to transform their public space in small increments. For example, in the heart of Paris in 1831, Rambuteau widens a major street up to 13meters, later named after him, and lays the ground work for the baron Haussmann. The type of work that Haussmann implements in Paris happens simultaneously all over France (Darin, 1988). From small villages to large cities, the fabric of the 19th century undergoes drastic transformations that can be assimilated to a rationalization process, and the establishment of a cohesive network. It is worth noting that the evidence of a first regulator plan for the whole Paris is the Jaussely plan of 1919, several decades after Haussmann's work (Pinon & DesCars, 1991). There is an agreement that these changes did not result from global planning decision, but rather result from incremental changes that still manage to produce a cohesive global network.

Sample

The sample is made of fifteen French settlements. This selection encompasses a full range of sizes and types, from small villages to large cities. They are selected based on the availability of the Napoleonic cadaster and its current version for the year 2014. While some randomness exists in the selection process, there is however an attempt to cover recognized types of urban layout: organic cities such as medieval town, planned cities such as bastides, walled cities, hilltop for the topography, and New town as representative of modernist planning. Some of settlements are selected because they have been previously studied by scholars, and exemplify a particular discourse about the growth and formation of cities. Both organic and planned towns are represented in the sample.

To represent early model of cities with preconceived structure, it includes two bastides of Gascony from the 13th century: Cologne (1284) and Mirande (1281). It also includes settlements that have already implemented planned extensions prior to the survey. Aix-en-Provence is such as case with the dismantling of parts of its south wall to create the "Cours Mirabeau" and the grid-like extension under the impulse of Archbishop Mazarin in 1646. Some, like Avignon, have preserved their walls over the 200 years period. Others only retained parts of their walls, which is the case of Antibes. Between the Napoleonic survey and today, most cities have replaced their walls by boulevards but retain a contained layout as in Carpentras, Mirande, Cologne, Limoges, and Clermont-Ferrand. A report in 1738 notices that the moats and walls of Clermont-Ferrand have been filled and replaced by boulevards, gardens and sometimes buildings (Arbos, 1930). Bonnieux, Gassin and Ramatuelle are examples of hilltop cities that deal with the constraints of topography.

Limoges is an example of a city that experiences drastic transformations during the early 20th century : the plan of 1919 follows a series of changes such as an alignment decree by Turgot (1775), the creation of three new straight and wide streets (1790), creation of public square and the demolition of the walls by Tourny (Perrier, 1938). In the significantly transformed cities, Poissy is an example of modernist planning, while Colomiers

[2]Édit sur les attributions du grand voyer, décembre 1607, article 4.

[3]Dictionnaire de l'administration française: ' *The Napoleonic land registry or cadastre, or old cadastral map of 1812 is a unique and centralized land registry recording parcels, established in France by the Act of 15 September 1807 based on a "cadastre-type" defined the 2nd of November 1802. It was developed as a legal and fiscal tool, to fairly tax the citizens on land contributions. It was established by surveying method and was later revised by the Law of April 16, 1930.*'

exemplifies the movement of New Town. In 1881, Colomiers is a small village established at a cross-road until the implementation of a masterplan for a New Town of 20 000 inhabitants designed by Atelier René Viguier in 1957 (Weidknnet, 2006). It is an example of the overlap of two very different urbanisms resulting from the organic accretion process over the years, and from the planning of the 50s.

The area of study for each city is based on the old legible boundary of the 1800's town. This boundary is most often the fortifications, or where they used to stand, they can also be

Table 1. Size of settlements/ references

	Aix-en-Provence	Antibes	Apt	Avignon	Bonnieux	Carpentras	Clermont-Ferrand	Cologne	Colomiers	La Rochelle	Poissy	Limoges	Mirande	Gassin	Ramatuelle
Napoleonic cadastral map (year)	1829	1814	1812	1820	1829	1834	1831	1845	1881	1811	1821	1812	1823	1808	1809
Selected area (ha) in1800s	67.8	21.0	10.6	155.0	9.7	19.9	50.2	6.4	53.1	65.2	33.9	30.3	18.2	1.2	1.0
Selected area (ha) in 2014	69.1	20.3	11.6	155.4	9.8	23.6	51.3	6.3	52.8	65.2	39.6	30.4	18.2	1.4	1.0
Total Area increase (%)	1.9	-3.5	8.9	0.2	0.8	15.5	2.1	-1.9	-0.5	0.1	14.6	0.1	-0.3	14.6	1.3

natural boundary such as sea, river or lake. Accordingly, the boundary for the 2014 cadastre follows as much as possible the Napoleonic boundary. As you can see in table 01, the selected area of 2014 varies between -3 to 15 percent of the 1800 area.

The relationship of public space and frontage

This section investigates the changes in the boundaries of the public space, or its frontage.

For the purpose of this study, public space is calculated as the area of land that is not enclosed by property boundaries. In other words, it encompasses the part of land that is not taxable (property taxes) according to the definition of the cadaster[4]. That includes: streets with their pavement, sidewalks and central medians, public squares, and sometimes parts of the walls. In average, public space represents about a third of the total area of land for both periods in all 15 settlements.

Frontage is defined as the length of all property limits that are adjacent to public space. Changes of frontage are recorded into two categories: frontage that has been created since the 1800s and frontage that existed in 1800s and has been removed since. The differentiation is important for understanding the mechanisms of transformation of the public space. The unchanged frontage combined with either category gives the block boundaries of the two periods: 1800s blocks are made of removed and unchanged frontages, while 2014 blocks are made of created and unchanged frontages. The quantitative profile of the sample is offered in Table 02.

The other measure concerns the syntactical properties of the settlements with the axial integration(Hillier & Hanson, 1984).

[4]*Recueil méthodique des lois, Décrets, Règlements, Instructions et Décisions sur le Cadastre de la France.*

Chapitre VII. Rues, Places, Chemins : Instruction du 8 avril 1808 – IV – 298- 151. Les rues, les places publiques; les grandes routes, les chemins vicinaux, les rivières, et généralement tous les objets non imposables (403), sont levés et décrits avec exactitude. Mais on peut ne figurer qu'approximativement et par des lignes ponctuées, les chemins et sentiers qui font partie intégrante des propriétés.

Table 2. Frontage

	Aix-en-Provence	Antibes	Apt	Avignon	Bonnieux	Carpentras	Clermont-Ferrand	Cologne	Colomiers	La Rochelle	Poissy	Limoges	Mirande	Gassin	Ramatuelle	Average all settlements
Block Area Increase (%)	-1.9	-11.9	-9.7	-7.3	-12.3	-13.3	-8.3	-6.1	-27.3	-4.1	-20.1	-15.7	-1.3	-8.7	-1.8	-10
Public Space Increase (%)	4.8	24.7	27.6	19.4	28.3	30.8	15.7	11.9	70.1	9.2	44.7	25.2	3.5	11.1	3.5	22
Frontage increase (%)	-6.1	4.5	1.4	0.9	5.8	1.1	-8.9	-0.3	57.2	-0.2	6.5	-18.1	-2.9	10.5	-0.6	3.4
Axial Integration increase (%)	7.0	7.7	22.5	23.0	18.3	20.5	19.4	19.9	19.6	8.3	42.8	25.8	-0.8	-4.1	0.4	15.4
SCL Integration increase (%)	0.9	3.2	17.6	11.4	2.0	8.8	3.2	8.8	76.8	12.1	26.7	6.6	6.8	9.3	-6.7	12.5

The increase of public space ranges from 3.5 to 70 percent. The increase refers to the comparison of the percentage of public space relative to the size of the settlement at each period. In average, settlements have an increase of 22 percent. Despite the transformations over a 200 years period, the amount frontage interestingly remains fairly stable. The linear of frontage removed is usually replaced by new ones. The exception is Colomiers which more than doubles its frontage to transform itself from a village into a new town and can be regarded as an exception, if not as an extreme intervention. Some settlements lose frontage in the process: Limoges (-18%), Clermont-Ferrand (-9%), Aix-en-Provence (-6%) and Mirande (-3%).

A first set of linear regression between the size of the settlement and the increases of public space first and then the increase of frontage shows no correlation. The size of the settlement does not related to its amount of public space, instead the area dedicated to public space remains fairly constant and represents about a third of the total area. Another hand, the number of blocks correlates with the percentage of public space; as the number of blocks increases so is the percentage of public space. As blocks are subdivided, the amount of land dedicated to the street around the block increases.

The gain of public space overall relates to the regularity of urban layout. Regular layouts have the least gain of public space, while irregular layouts tend to increase their public space. Axial integration, prior changes, correlates negatively with the gain of public space (r^2= 0.40, p=0.0113*, n=15). This result follows the logic that regular grids tend to be more stable than irregular ones. However, this logic does not apply to the frontage. The gain of frontage, an average of 3.5 percent of the existing one, is not necessarily associated with the regularity of the urban layout.

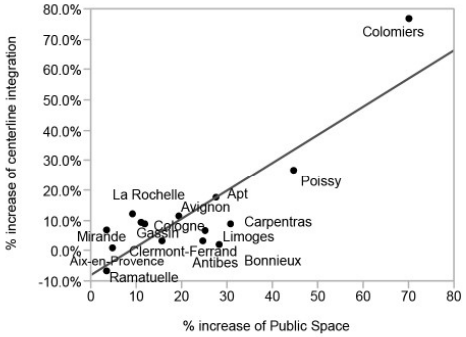
Another hand the increase of integration is correlated to the increase of public space. Both phenomena are related to each other (figure 01). The transformations implemented all contribute to a more integrated system overall and work towards a more cohesive network.

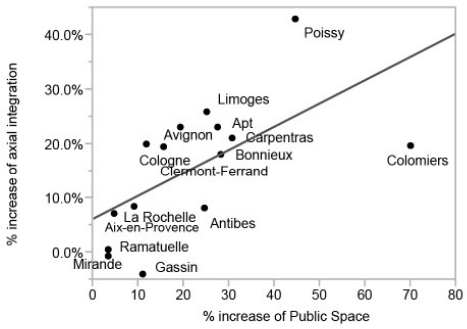
Mechanisms of rationalization

This section focuses on the mechanisms of transformations applied to the frontage of the public space.

In Paris, new streets are created for different pruposes: to release, to distribute or to traverse (Pinon & DesCars, 1991). Their purpose is to facilitate the circulation, but also to create new visual perspectives, to ventilate, to sanitize and to create new real estate. But on top of the creation of new streets, other mechanisms are put in place that transform public space and its boundaries. The mechanisms of changes in frontage bound-

Figure 1. linear regression between increase of public space and axial and street centerline integrations





Linear Fit

%Integration increase = -0.080016 + 0.0093048*%PublicSpaceIncrease

Summary of Fit

RSquare	**0.73**
RSquare Adj	0.704914
Root Mean Square Error	0.105242
Mean of Response	0.125
Observations (or Sum Wgts)	15

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	0.38149832	0.381498	34.4438
Error	13	0.14398768	0.011076	**Prob > F**
C. Total	14	0.52548600		**<.0001***

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	-0.080016	0.044257	-1.81	0.0938
%PublicSpaceIncrease	0.0093048	0.001585	5.87	<.0001*

Linear Fit

%AxialIntegrationhincrease = 0.060 + 0.004*%PublicSpaceIncrease

Summary of Fit

RSquare	**0.38**
RSquare Adj	0.332586
Root Mean Square Error	0.100291
Mean of Response	0.1542
Observations (or Sum Wgts)	15

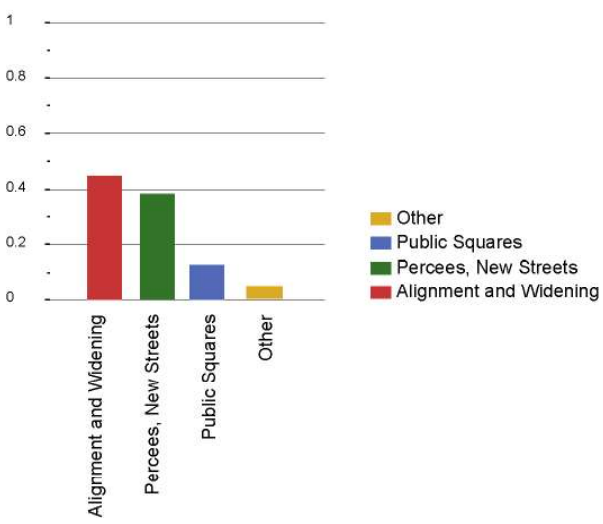
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	0.08022937	0.080229	7.9765
Error	13	0.13075703	0.010058	**Prob > F**
C. Total	14	0.21098640		**0.0143***

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.0601828	0.042175	1.43	0.1772
%PublicSpaceIncrease	0.004267	0.001511	2.82	0.0143*

Figure 2. Ratios of the different Mechanisms that account for all the changes



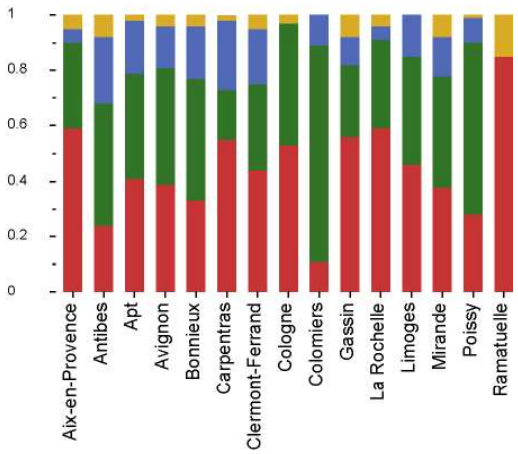
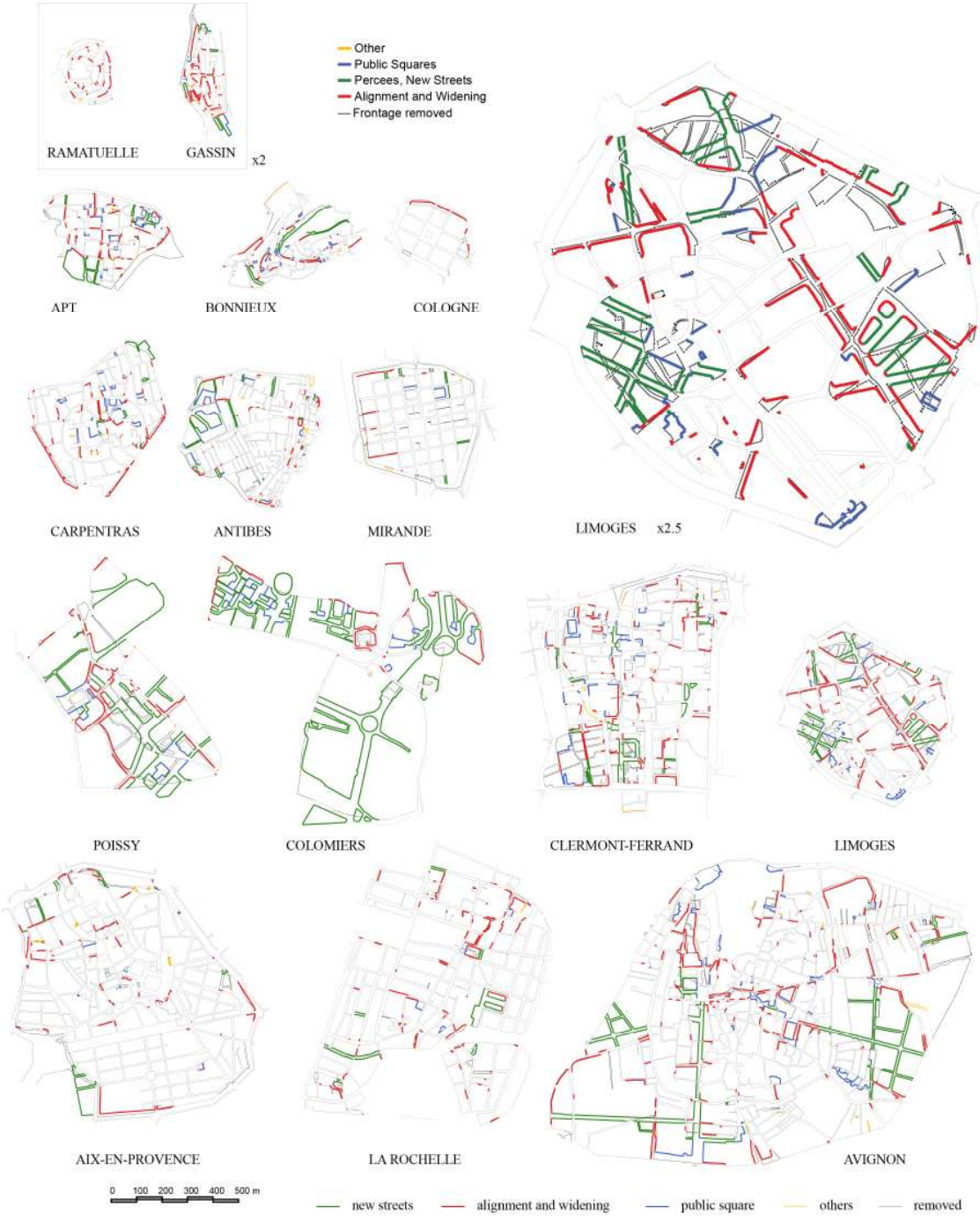


Figure 3. Different mechanisms applied to new frontage: new street, alignment and widening, public square and other



ary can be divided in three major categories: the creation of a new street, often in the use of "percée" (to pierce through the existing fabric), the alignment and widening of existing streets, expansion of an existing public square or creation of small squares. A last category includes other forms of changes.

The plot of Figure 02-left shows the proportion of these mechanisms overall. The two major mechanisms are the alignment and widening of streets that account for 45 percent of the changes, followed by the creation of new streets (38%). The creation of new frontage for public squares represents 13 percent and very few other mechanisms are

put in place (5%). For a clearer understanding, the stacked bin diagrams in figure 02-right illustrates the proportions of these mechanisms for each settlement. Colomiers and Ramatuelle are very polarized. Colomiers develops through the creations of new streets, while Ramatuelle transforms mainly by the aligning and widening of its streets. Figure 03 shows the location of the different types of changes in frontage: alignment and widening (red), new streets (green), public square (blue), and other (yellow).

Overall the current layouts have less axial lines and street centerlines but they have more area dedicated to public space. These observations might at first look contradictory. The creation of new streets should contribute in raising both the area of the street but also the number of street segment. It is not the case however when the new street is aligned with existing streets creating a connection but combined with alignment reduce the number of axial lines but not street segments. The creation of larger public squares contributes to the opposite: the area of the public space increases but the number of axial lines or street centerlines may decease or remain stable. In another hand, the alignment and widening process tend to reduce the number of axial lines and street segments.

Syntactically the creation of new streets and the widening and straightening process have two very different impacts. The former creates a connection that did not exist, and adds a link. The latter sometimes does the opposite; it consolidates smaller street segments into a single and longer axis (figure 04 – upper part). The example of "rue Jean Jaurès" in Limoges illustrates the impact of the widening process on the syntactic structure and its legibility.

For a similar distance, the cognitive effort engaged in navigating the series of streets in 1812 add up to about 40 times more changes of direction measured in degrees. From a cognitive point of view, the widening eased the legibility of the street by considerably lowering the shifts in direction as one moves through the street. From the point of view of the overall structure, the widening and alignment process brings higher integration values for both the axial and centerline representations. While in 1812 the average integration of the streets are slightly higher that the city as a whole, in 2014 the new street surfaces as a much more integrated street that the average, one segment carrying the highest value overall.

The creation of new streets in the existing fabric transforms the syntactic core of the neighborhood (figure 04 –lower part). Previously the neighborhood was isolated from the main integration core of the city as a whole and it was made up of a series of small public squares functioning fairly independently form each other. The new development created a fully integrated system of public squares linked to form a local integrated core expanding the overall "superstructure" of the town. It also consolidates the small public space into a larger one, "Place des Bancs" to which is added "Place des Fossés", from which main axis depart or cross to reach other public places.

Conclusion

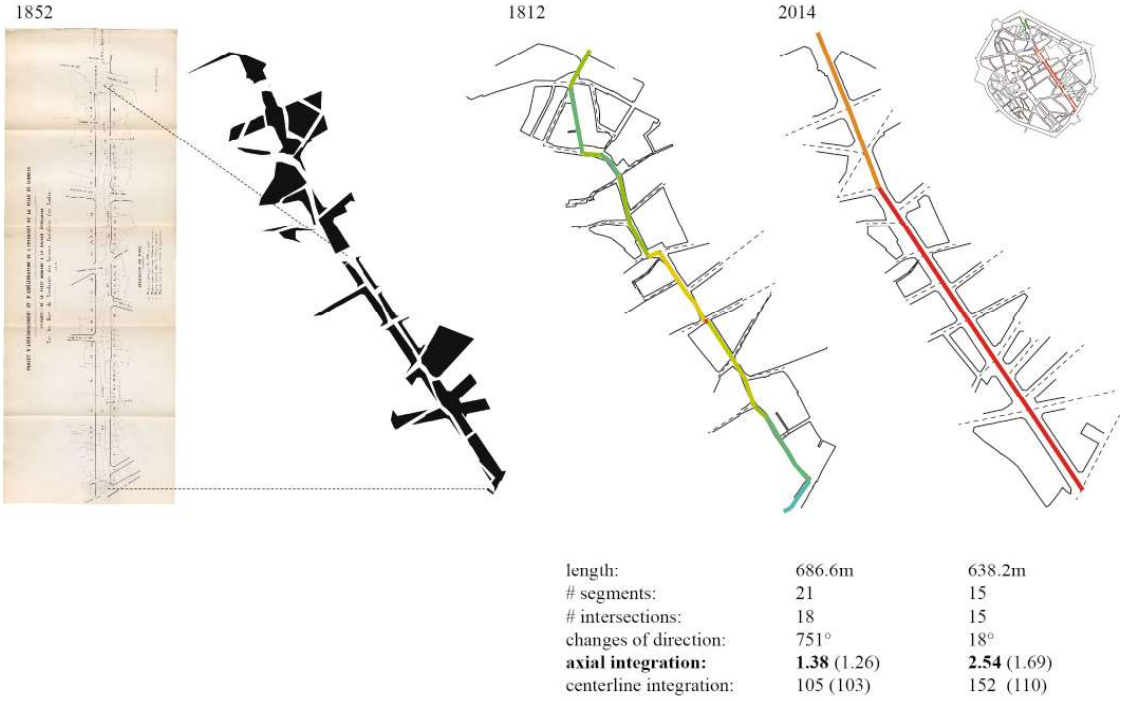
One of the questions this paper tried to answer was the impact of this systematic increase of public space on the global structure of town. It was observed that the increase of public space correlates proportionally with an increase of integration. It suggests that these changes implemented over the 200 years have participated to the creation of a more integrated system as a whole. Findings have highlighted the transformation of the public space into a rationalized system made of local nodes – more defined and larger public squares – linked by longer and straighter linear elements that suggest the formation of a "supergrid" system.

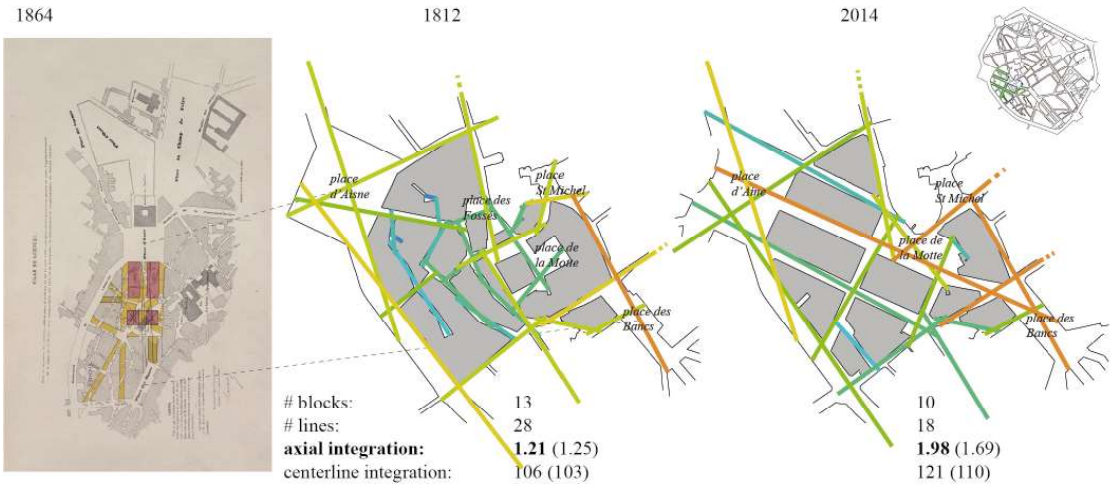
In this study of French settlement the rationalization process had happened systematically but was implemented over a long period of time. These transformations are not part of a masterplan, the changes were incremental. It was illustrated by two interventions in Limoges that occurred 12 years apart. While implemented locally, both contributed to the increase of global integration. If there is a natural tendency for cities to rationalize their structure, such studies could help in integrating informal settlements of the 20th and 21st centuries, located on periphery of metropoles, to the superstructure of these cities by minimizing the impact on private spaces.

Figure 4. (upper part) Consolidation of existing streets in Limoges into *rue Jean Jaurès* by an alignment and widening process planned in 1852[1]. Next are the centerline maps of 1812 and 2014 showing the integration values: with high integration in red and low in blue. The numbers in parenthesis are the average value for the whole town.
(lower part) Redevelopment of the *quartier des Arènes* in Limoges after the fire of 1864 by creation of new streets[2]. Next are the axial maps of 1812 and 2014 (extracts) showing the integration values: with high integration in red and low in blue. The numbers in parenthesis are the average value for the whole town

[1]Plan presented in book *De l'ouverture d'une nouvelle rue au centre de la ville de Limoges, en traversant les rues du Verdurier, des Suisses, Poulaillere et des Taules* published by the mayor of Limoges on the 1st of May 1852 , including the report of the town-architect M. Regnault established the 15th of March 1852.

[2]"*Plan for the Arènes neighbourhood destroyed in the night of the 15-16th of August 1894 including the projected streets, the enlargement of la Motte plaza, the alignment of the street de la boucherie, the changes and extension of the covered market*." established in Limoges on the 6th of September 1864 by the Voyer-Agent M. Lansade.





Further studies could also be developed to clarify the distinction of the centerline versus the axial line. The difference between the axial line and the centerline is that the axial line traverses a series of convex spaces and responds more to the boundary of buildings. It follows the logic of a pedestrian for whom the straight line is the shorter path, and who tends to minimize the angle to his destination (Dalton, Peponis, & Conroy-Dalton, 2003). In opposition, the centerline representation is a more segmented, with more numerous nodes, and follows the logic of the car by being more directional. The way of representing the city, from either the pedestrian or the vehicular points of view, is also legible in a second set of transformation that leads to the 21st century streets. They result from a series of changes on the horizontal plane (sidewalk, crosswalk, paving, etc.). These changes in materiality are not just subtle design changes, they play a deterministic role on the accessibility of the public space. It questions certain modes of representations of the streets such as axial map, property boundaries, and street centerline, which embed only some aspects of the boundaries that privileges either the pedestrian experience or the movement of the car. The independence of the street system advocated by the modern movement has accomplished a first disconnection between the public square and the street. But even in traditional settlements which result from a more organic growth, the distinction is created by a second type of intervention which is the subdivision of its horizontal surface that should be further studied in more details.

References

Arbos, P. (1930). *Étude de géographie urbaine: Clermont-Ferrand:* G. Delaunay.
Block, M. (1891). *Dictionnaire de l'administration française:* Berger-Levrault et cie.
Caliandro, V. (1978). Street form and use: A survey of principal American street environments. In S. Anderson (Ed.), *On streets* (MIT Press, Cambridge, Mass) 151-185.
Dalton, Nickolas, Peponis, John, & Conroy-Dalton, Ruth. (2003). *To tame a TIGER one has to know its nature: extending weighted angular integration to the description of GIS road-centerline data for large scale urban analysis.* Paper presented at the Space syntax fourth international symposium, London.
Darin, M. (1988). L*es grandes percées urbaines du XIXe siècle: quatre villes de province*. Annales, 477-505.
Ellis, W. C. (1978). The spatial structure of streets. In S. Anderson (Ed.), *On streets* (MIT Press, Cambridge, Mass) 115-137.
Hillier, B. (1989). The architecture of the urban object. *Ekistics-the Problems and Science of Human Settlements*, *56*(334-35), 5-21.
Hillier, B., Hanson, J. (1984). *The social logic of space* (Cambridge University Press).
Levy, A. (1999). *Urban morphology and the problem of the modern urban fabric: some questions for research.* Urban Morphology, 3, 79-85.
Martin, L. (1972). The Grid as Generator. In L. Martin & L. March (Eds.), *Urban Space and Structures* (Cambridge University Press, Cambridge).
Perrier, A. (1938). *Limoges. Étude de géographie urbaine.* Revue géographique des Pyrénées et du Sud-Ouest, *9*(4), 317-386.
Pinon, Pierre, & DesCars, Jean. (1991). *Le Paris d'Haussmann* (Picard, . Paris).
Turner, A. (2007). *From axial to road-centre lines: a new representation for space syntax and a new model of route choice for transport network analysis.* Environment and Planning B: Planning and Design, 34(3), 539-555.
Weidknnet, P. (2006). *Colomiers ville-neuve: une réalisation municipale sur le modèle des new towns anglaises.* Histoire urbaine, 3(17), 109-128.

Regeneration of the Bloemfontein city square

Das Steÿn (J.J.)
Department of Urban and Regional Planning, Free State University, Bloemfontein, South Africa
Keywords: Bloemfontein, city square, regeneration

Abstract

When Bloemfontein was founded in 1846 it started as a small administration town serving a agricultural community of Boers. The first layout of the town allowed for a market square where the two main roads crossed in the center. This square known as Market Square housed the local market for the rest of the century.

The Boers (later known as Afrikaners) got independence from England in 1854. Three decades later the first building, a market building was established on the square. As part of the combined Boer-forces the Free State lost its independence in the Anglo-Boer War (1899-1902).

The English dominated the town for the next four decades. Thirty years later into power, the first regeneration took place. A new square was developed with the name Hoffman Square.

The Afrikaners took over the political power in the city in 1945 and was in power for about four decades. Thirty years later the second regeneration took place. The square was redesigned to fit the needs of the new people in power.

In 1994 South Africa became a new democratic republic with the ANC in control of the city which grew into a metropolitan area. Twenty years later the new power in charge had a new square developed, the third regeneration.

This paper will show how square was designed to fit the people in power and how the urban fabric around the square changed with each change in power structures.

Introduction

Bloemfontein was after its founding the capital of the Orange Free State Republic and later a provincial capital in the bigger South Africa. This paper will show how central square was designed to fit the people in power in four different eras and how the urban fabric around the square changed with each change in power structures. This is a subjective view of history as seen by an Afrikaner.

Methodology

Hoffman Square will be shown in the four stages of development after the establishing of the town to the present day city. Historical background will be given of each era and how the design of the square was influenced by the political power dominating the city at the time of the change. In each of the four areas the square was designed to fit the people in power. The surrounding urban fabric in terms of its physical form and movement patterns will also be addressed.

Forming process and historical background

Migration patterns, climate and war determined to a large extend the population distributions in South Africa. This then had an effect on the politics of power in this region.

The San and the Khoi-khoi received the status of the first indigenous people of South Africa from the United Nations. As nomads they did not really settle in any place. Both the Blacks and the Whites came later and are thus both settlers. The Blacks moved southwards from the great lakes of Africa from about the fourteenth century. The Xhosas did not go to the southern point of the continent as it was a winter rainfall area and they only had crops that can be planted in the summer. The Dutch East Indian Company arrived in the southern point (now Cape Town) in 1652 and spread from there as they brought crops that can be planted in the winter with them. The two migrating movements met in 1702 at the Fish River (about at a point approximately 800 kilometre east of Cape Town) (Diamond, J., 2006:391).

The introduction of maize (corn) in Mozambique from the Americas led to agricultural surpluses and increased population amongst the Zulus which led to the rise of the Zulu Empire under Shaka (1816–1828). Mzilikazi a lieutenant of Shaka rebelled in 1823 and fled northwards with his tribe. He fled west into the Transvaal and absorbed other tribes while removing all opposition by devastation and murder on a grand scale. Between them they killed estimates of between one and two million people, leaving the region depopulated. The Voortrekkers seeking freedom from British rule, were able to occupy and take ownership of the Highveld area without opposition in the 1830's[1].

The Boers established their first town at Winburg in 1841 but unfortunately the British followed and found their first settlement 120 kilometre to the south at Bloemfontein in 1846. Their excuse was that a military post was necessary to keep the peace in the area. Two years later the British annexed the territory and established two more towns namely Smithfield and Harrismith. In 1854 the British found that keeping the peace was too costly and withdrew. The Republic of the Orange Free State was established with Bloemfontein as its capital. The discovery of diamonds in Kimberley to the west in the 1870's as well as gold in the 1880's in Transvaal led to the development of the Orange Free State. With their eyes on the gold the British conquered both the Orange Free State and the Transvaal Republic after the Anglo-Boer War (1899-1902). The Orange Free State became part of a bigger British Colony with provincial status and Bloemfontein its capital. The English controlled the town council up to 1945 when an Afrikaner council took over. The pro-British government of South Africa came to a fall in 1948 and the National Party governed the country, the Orange Free State Province and the city council up to 1994. Up till this time Blacks were excluded from politics. A new dispensation was found and the African National Congress (ANC) took power on all levels of government.

[1]The population figures for the Orange Free State in 1878 shows 30 000 whites and only 15 000 blacks at that time (Giliomee, 2004:235).

The Pioneer stage (1854-1902)

In 1848 Andrew Bain did the first layout for the town consisting of fifty four erven both sides of the meandering Bloemspruit. It was a British settlement as only two of the more than thirty families living in town were Afrikaans in 1848 (Schoeman, 1980:10). Two years later John Hopkins added another 100 erven. Now the town had three squares, later known as market, church and president square. These lots were only filled up by 1870. By 1854 there was about a hundred houses in Bloemfontein.

Karel Schoeman (1987:7) in his "Portrait of Bloemfontein 1860-1910" writes that "*the earliest existing photographs of Bloemfontein in the years 1865 and 1866, show a shabby village of clay houses, …the seat of the president, and apart from this mainly of importance as a centre for trade and church dorp (town)*". At this stage roofs were mainly thatched roofs or flat roofs made from reed with brackish clay on top with only a few corrugated iron roofs. By 1880 the town had a population of 1688, 297 houses, thirty shops, three hotels, three billiard rooms and six churches including a few double storey buildings. Gold in Transvaal and the completion of the railroad to Bloemfontein in 1890[2] gave rise to still greater prosperity and progress and allowed Bloemfontein to develop into a worthy capital.

The first regeneration – the market buildings

Market Square was a large opening in the centre or town. The two main roads crossed the square, one from Cape Town to Johannesburg and the other from the Eastern Free State to Kimberley. It was the centre of activities with the Government and Parliament Building along it together with some shops and private houses. The latter was replaced by the Bloemfontein Club, a post office and some hotels. It started to form an architectural unity. Standing on the square during this era, the two main roads to the town – Church Street and Maitland Street – four landmarks terminated the views. Looking east the Bloemfontein station building, to the west the Government building, north the Two Tower Church while the Basotho Memorial in the middle of the road on Monument Hill was a landmark since 1873 to the south.

Market square was used as an area for unyoking oxen and bartering by the Boers. The first village management board was created in 1859 (Scholtz, 1970:367). They organized a regular market and in the same year a shabby market building was erected with a bell beside it. It initially also served as a town hall and library.

Municipal status was achieved in 1880 and the council ordered that the market as the town's biggest income generator should have a new building. This was erected by architect Richard Wocke in 1882 nearly thirty years after becoming a republic. On Saturdays up to forty wagonloads of goods were sold. The market was increased by a pavilion next to it with iron columns and an iron roof in 1890. The market together with the church, were the centre of activities for the Boers living in this part of the Republic. Power in the town was mostly in the hands of the English and they did what was good for the town and for business. The British colonial approach to the planning of cities is described by Hall (1990: 189-190) as being "…*based on the fiction that these cities were completely white with, perhaps, ... Africans were either assumed not to exist or … to be herded into squatter reservations*". Blacks came to Bloemfontein looking for work and they were only allowed to stay by the town commissioners if they had a job and were allocated to Waaihoek "*small native location at the south-east entrance to the town*" (Schoeman, 1980: 35).

Occupation and formalization (1902-1945)

After the Anglo-Boer War (1899-1902) a large occupation force was stationed in Bloemfontein and had a long term effect on power relations in the city. The white population increased from about 5 800 white inhabitants before the war to 17 558 in 1904 (Schoe-

[2]By 1890 the population grew to 3 379 of which 2 077 was white and 1 302 were black (Schoeman, 1980: 10).

man, 1982:126). "*After the war the Free State, as Orange River Colony became part of the British Empire, and as seat of the British Lieutenant Governor and a large British garrison Bloemfontein entered a brief golden age of pride, prosperity and elegance …*" (Schoeman, 1987:119). After the formation of Union of South Africa in 1910 Bloemfontein became the judicial capital of the country but also the capital of the Orange Free State Province. All politics in South Africa was dominated by a pro-Afrikaner or pro-British sentiment. Although politics in the Free State, on both provincial and national level, was dominated by Afrikaner, the City Council of Bloemfontein was in the hands of the pro-English faction until 1945. Between 1919 and 1939 a majority of the city councilors and municipal officials were relative new arrivals from England. The city was seen as "*an example progressive and forward-looking enterprise*" (Schoeman, 1980:247). Bloemfontein was English for 99 years.

During the First and the Second World War (1914-1919 & 1939-1945) the South African Government at both times was pro-British and took part in the war on the side of England. The Afrikaners was against fighting for Britain. In 1914 it led to a rebellion against the government and a civil war in the country. In 1939 the active opposition from Afrikaner side led to the hundreds of Afrikaners being put into internment camps for the duration of the war. The Afrikaners traditionally farmers were forced to the cities in the 1930 where they were second class citizens but had the right to vote[3].

The second regeneration – Hoffman Square

In 1904 the first agitation to move the market to Baumann Square was published. More people complained about the market as it was seen as "an eyesore" and "a disgrace to the town". Years of endless meetings on the subject and an infinite number of letters in the press on an alternative location for the market followed. Meanwhile the town introduced a tram service in 1915 and a tram kiosk was built on the north-western side of the market square. Six years later trees, flower beds and a fountain were added to this part of the square. In 1925 a new market was built on Baumann Square and the old market square was renamed as Hoffman Square. In the same year a war memorial in the form of a cenotaph was erected on the market square. Later the old market building was demolished and new park was developed on the site. Church Street now divided it into two squares, one on the east and one on the west, with Church Street going through the middle with roads around the two squares. In 1935 the eastern square were redesigned with a leaping fountain brightened by lights in seven colours. The effect was "*a huge blaze of colours play on the spray, firstly in red, suddenly a change to green, and then to yellow*" (Schoeman, 1980:258). For decades families would come at night to look at the fountain and stroll about.

Commercial buildings began to dominate the square. It contained shops on one or more floors and offices on top. Two big hotels were on the square while the rest of the better hotels were within a few hundred meters. Apartment buildings also formed part of the central business area of that time. During the 1930's a series of new building were erected around Hoffman Square. Champion Building, later John Orr, was the first building in South Africa that was built over a street in South Africa (Adderley Street). Others in the 1930's were the new Post Office, Cuthberts Building, Barclays Bank and Mutual Building, all in sandstone. The first cinema, the Plaza, faced directly onto the square and was followed by two other cinemas, namely the Ritz one block away and the Capitol just south of the fountain. Together with the square being used as a terminal building, first for the trams and later for the bus service, this led to a vibrant city life at night. In the Second World War-years the Hoffman Square was also used as a recruiting office for the army.

Control and growth of wealth (1945-1994)

The Afrikaners controlled Bloemfontein from March 1945 and the whole country from 1948. They wanted freedom for themselves and for other ethnic groups in the country.

[3]In 1890 only 2% of Afrikaners were urbanized but this increased to 50% in 1936 (Giliomee, 2004:274).

Fearing black domination in a shared state they opted for separate development also known as apartheid. Worldwide the economic growth after the Second World War and the baby boom led to wealth increase in all societies. This also led to black urbanization in this period as workers were needed in the industries. South Africa became an industrialized country and not so dependant on mining for jobs or foreign exchange any more. A new generation of rich Afrikaners was more interested in their own well-being than in that of the volk (own people). They wanted their bread buttered on both sides, with cheap black labor but not wanting to give these people civil rights. The idealism of the previous generation was frowned on and individualism was now the norm. Economic sanctions, a border war with so called freedom fighters lasting nearly twenty years led to the abandonment of the policy of separate development. A referendum was held on this by white voters in 1992 on the issue whether the National Party government must proceed with negotiations with the ANC for a new constitution. The Whites voted by a 2-1 majority to abolish apartheid but also to lose their own power (nearly 50% of Afrikaners voted no in the referendum). In the black community no voting took place but thousands of Blacks were necklaced[4] or otherwise killed between 1990 to 1994 and that guaranteed the ANC the support of the black masses (in Natal province alone 4 820 killings were reported (TRC, 1998:4) but Jeffreys think that it might be up to 20 000 people (Roodt, 2000:114)).

The third regeneration – the second Hoffman Square

Bloemfontein was proclaimed a city in May 1945[5]. In the 1960's the Afrikaner City Council asked the city architect, Irma Vermeulen, to come up with a new design for the square which was executed in the 1970's. At this stage wealth led to the establishment of big office buildings on the southern side leading to isolation of the square. The cinemas closed down and increase in wealth led to the phasing out of regular bus services as people used their own transport. Furthermore a city bypass was built around the city, losing all the tourists who used to go through Hoffman Square. The new design also closed down portion of Church Street that divided the square. The square "*under the pretext of modernisation, most of the trees were uprooted, the magnificent flower and rose beds demolished and lawn areas replaced by paving. All in all, Hoffman Square was no longer to be a place where loiterers and idle vagrants could find shelter and rest.*" (Wolvaart, 2014). Hoffman Square now became an isolated island in the middle of the city.

The layout of the second Hoffman Square can be seen as modern and moving away from the formal layout of the previous design. The green areas were raised above ground level in order for it to be seen only but not being able to set foot on it. In order to fit ablution facilities and a tourist office on the square but without having a building sticking out the architect sort of bent the floor of the square to fit the buildings beneath the paving on the western side. This means that the square was elevated one storey above floor level on that side. Only two sets of stairs to access it was provided in the south-west and north-west corners but it was the side that attracted few pedestrians. On that side was the South African Reserve Bank who did not deal with people only with other banks and on the other side Mutual Building also not for normal business for the man in the street. This meant that one half of the new layout was without people using it at all.

The big department stores in the center of the city closed down and was either replaced by hyper-markets serving the region on the outskirts of town or by a new mall developed two kilometer to the west. The higher order businesses moved out of the city center and with them the people with money. The control over space and people that the Afrikaner thought it obtained in the late 1940's was given up by the end of this epoch. South Africa only got television in 1973 as it was thought to bring English and American values into the Afrikaner way of life. This meant the drive for public participation that fol-

[4]Necklacing is the practice of summary execution and torture carried out by forcing a rubber tyre, filled with petrol, around a victim's chest and arms, and setting it on fire.

[5]The total population at that stage was 67 196 consisting of 30 005 whites and 37 191 blacks (Schoeman, 1980:247).

lowed the student revolution of 1968/69 did reach the Afrikaners way of thinking. They were satisfied to leave the decision making to the city fathers.

A new deal (1994 to 2015)

Transitional local governments were introduced until the first local election under the new constitution in 1996 at which stage the so called traditional white parties only received 10% of the vote in the new Mangaung Council with the ANC controlling more than two thirds of the councillors. Bloemfontein as well as five other municipalities were amalgamated to form the new municipality, making sure that Whites could not be a majority in any municipality. In 2011 the Metro of Mangaung which now includes Bloemfontein but also two black towns Thaba N'chu and Botchabelo, respectively 45 and 60 kilometre away, had 747 431 inhabitants of which only 13% were white (Afrikaans and English together). Crime and corruption got out of hands and became part of live in South Africa (Steyn, 2014). Power corrupts but lack of power frustrates especially in the field of service delivery. On the local level an escalation of civil unrest and protests is taking place. "*Between April 2012 and March this year (2013), police responded to 12 399 incidents of public unrest, of which 10 517 were regarded as 'peaceful'*" (Mbanjwa, X., 2013). The emphasis in the new democratic South Africa is that public participation is now the alpha and the omega of all planning. No planning can be done without a public participation process. In this period of human rights the criminals got more rights than the police leading to a situation where the police are reluctant to take action and crime escalates. The political power now is totally in the hands of the Blacks and the white minority have no influence in local politics. However rich businessmen, especially a Greek-family now controls a large part of the real estate in the city centre. They have influence with the government of the day and most of their buildings is rented out to government departments. While a large part of the traditional black area of the central business district have accommodated the informal sector doing business on the streets, in the area where these new Greek owners have an influence, this type of business does not occur. Whites are still more affluent than Blacks and moved out of the centre of town to do their business in the malls, hyper-markets or in neighbourhood shopping centres.

The fourth regeneration – a hybrid between formal and informal

As the central business district was losing high order business and office use to the adjacent neighbourhoods it deteriorated into a dirty and crime ridden area. Hoffman Square was now a harsh and unfriendly paved area only used by most only as a pedestrian thoroughfare with some informal vendors squatting on it. The new city council wrote out a competition for the redevelopment of Hoffman Square but wanted a parking garage underneath the square. After receiving a large number of entries, an architect was appointed in 1995 to redesign the square. In the next ten years no progress was made with the redevelopment as officials and councillors do not stay long in one position. In 2005 the firm was approached again to redesign the square. The requirements changed several times in 2008/9 in order to try and put "a '*Fan-park', a supplementary venue for the 2010 Fifa World Cup Soccer Game screenings – including a giant TV screen (15 x 8m), stage and amphitheatre, as well as an extensive open area to allow for 5000 people standing*." (Wolvaart, 2014). During this time a consortium for the redevelopment of Bloemfontein Central Business District was appointed who also did a schematic design of the square but they were not told about to the appointment of the architects (Steÿn & Potgieter, 2007). A young team of architects[6] took over from the previous architect and viewed the project "*seen as a landscape project rather than an architectural project – great learning process*." (Wolvaart, 2014). They accommodated the present pedestrian flow over the square and the historical features on and around the square. The square now had two distinct areas, on the east of the Church Street axis a more informal layout

[6]Anneke Wolvaart from Cube Architects was the leader of the team.

with places for vendors and an ablution block. On the west a formal park landscape. The roads on the eastern and western sides were included into the design. However no fountains were allowed on the site by the principals. A lot of research went into the landscaping and the artwork in form of mosaics that were produced for the footpaths.

As a whole the layout can be seen a success. In opened up the square for the use of the people walking across it and give the idea of space. The elevation difference from north to south was also handled very well. The only critique is that in the green areas on the western section all trees were planted around the grass but nothing on it.

In terms of public participation only the owners of property in the vicinity were involved but got no meaningful feedback. Officials at the municipality made the main decisions and the public at large were not involved at all. Ad hoc decisions like choosing the artwork mosaics were done by one person while he also decided that vendors will not be allowed on the square although pavilions to accommodate them are supplied. In the new South Africa a lot of infrastructure is only produced before municipal elections and the next election is in 2016. If this is also the case with the regeneration of Hoffman Square it can only deliver positive results.

Conclusion

Hoffman Square as the central square in Bloemfontein underwent four changes in the last 160 years. Every time it was changed to fit the changing need of the central business area as well as the people in power but also to benefit the users. The third regeneration of the square was the least successful as it was not user friendly. The present square design seems good but only time will tell if it can serve the city and its inhabitants for a long period.

References

Diamond, J. (2006) *Zwaarden, Paarden en Ziektekiemen* (7th edition), (Uitgewerij Het Spectrum, Utrecht).
Giliomee, H (2004) *Die Afrikaners: 'n biografie.* (Tafelberg Uitgewers, Kaapstad).
Hall, P. (1988) Cities of Tomorrow. (Basil Blackwell, Oxford).
Mbanjwa, X. 2013. Zuma leads the protest nation. *City Press*, 22 September 2013.
Roodt, D. (2000) *Om die Waarheidskommissie te vergeet.* (Praag, Dainfern).
Schoeman, K. (1980) *Bloemfontein: die Ontstaan van 'n Stad 1846-1946.* (Human & Rousseau, Kaapstad).
Schoeman, K. (1982) *Vrystaat Erfenis: Bouwerk en geboue van die 19de eeu.* (Human & Rousseau, Kaapstad).
Schoeman, K. (1987) *Portrait of Bloemfontein 1860-1910.* (Human & Rosseau, Cape Town).
Scholtz, G.D. (1970) 'Bloemfontein", in Potgieter, D.J. (ed.), *Standard Encyclopedia of Southern Africa, Vol.* 2,(Nasou Limited, Cape Town) 366-373.
Steÿn, J.J. & Potgieter, P.J. (2007) *Bloemfontein CBD Masterplan T4: Comprehensive CBD Land-use Plan.* (Research Publication No. 36, Department of Urban and Regional Planning, University of the Free State, Bloemfontein).
Steÿn, J.J. 2014. *Confronting the Power of the Babblers and the Billionaires is Necessary to Make South Africa a Great Place.* (SAPI Planning Africa 2014 Making Great Places Conference, Durban, 19-22 October).
TRC (Truth and Reconcilliation Commission), 1998, *The Report of the Truth and Reconciliation Commission, Volume 3,* (Online on 15 June 2015 at http://www.justice.gov.za/trc/report/finalreport/Volume%203.pdf)
Wolvaart, A. (2014) Redevelopment of Hoffman Square and Surrounds, Bloemfontein City Centre (Unpublished notes for a lecture at SAARP (SA Association for Retired Persons), Bloemfontein).
Wolvaart, A (2015) Interview with Anneke Wolvaart, architect in charge of the redesign of Hoffman Square on 18th of May 2015, in Bloemfontein.

"Public Open Space" as a generator of urban forms in the viceroyalty of New Spain

Tarsicio Pastrana Salcedo
National Polytechnical Institute, Engineering and Architecture College campus Tecamachalco, Mexico
Keywords : Mexico, Public Open Space (POS), Historic cities

Abstract

This paper analyses the viceroyalty's urbanism in New Spain, focusing on its public open space design as a configuring element of the current settlements in the Mexican territory. It shows evidence of the unique features that a model has different from other regions. To this purpose descriptions written by chroniclers of the mendicant orders were used, these were civilians who described a variety of daily activities carried out at the time, maps and geographical relationships. The information obtained from this research is useful for showing that the configuration of the cities located in the Mesoamerican region has an important pre-Hispanic influence observed in the large sizing of the public open space as a set. Public Open Space is often referred to by urban planners and landscape architects by the acronym 'POS' with varied interpretations of the term, however for this research we use the term Public meaning a space available for public use and access, and the term Open meaning a space that is outdoors, not within a building.

Introduction

This paper analyses the viceroyalty's urbanism in New Spain, focusing on its Public Open Space (POS)I design as a configuring element of the current settlements in the Mexican territory. It shows evidence of its unique features different from other regions. To this purpose descriptions written by chroniclers of the mendicant orders were used, these were civilians who described a variety of daily activities carried out at the time, maps and geographical relationships. The information obtained from this research is useful to show that the configuration of the cities located in the Mesoamerican region has an important pre-Hispanic influence observed in the large sizing of the public open space as a set.

Napoleonic cadaster

The connotation that the settings of villages and cities acquired, and the relationship between the town square, the courtyard of the convent and the convent's orchard is a result of the spatial organization and its activities. The consulted documents and their relation to the current layout allow us to generate a link between these three architectural and urban spaces to consider them both as the population hub. This runs counter to the lines of research that study them in isolation, where this is analyzed as a large space mainly divided into its functions. In this scope, work is inserted into the theoretical current that considers novo-Hispanic urbanism as the result of an amalgamation of peninsular techniques that had been influenced by Renaissance writers and by vestiges of Pre-Hispanic urbanism. Lucia Mier mentions this debate regarding the origin of American urbanism, she classifies it in five positions: a) Rational urban spontaneous response, b) Influence of classical theories of the Italian Renaissance, c) The survival of indigenous urbanism, d) Continuity in the peninsular planning of America e) The combination of these last two positions, as survival and continuity: two integrated positions (Mier & Rocha, 2005). For purposes of this paper, it is considered that the American urbanism presents different solutions in regions encompassed by the five Terán's proposals, we'll specifically discuss the subsection "e" in the current central zone of Mexico.

A lot has been said of the Public Open Space (POS)[1], however, it's worth noting some peculiarities that will be addressed in this paper. Although POS is vital in the evangelization of the Viceroyalty of New Spain, usually its scope is associated with the atriums of the monasteries; outdoor spaces for gardens, orchards and town squares are excluded or treated in isolation, spaces which together formed a large-scale area located in the center of the villages. If these three areas are understood as one, we will come to see that the activities for the community and the domestic activities were always carried out outside the covered space. We must see these spaces as a single one but separated by their functions with architectural elements, which originally could've been small fences, roads, water canals, among others, giving the villages a very different look to the current one, where POS used to predominate over built space.

Forming process. Brief introduction of POS in Mesoamerica

It's important to emphasize that the Mesoamerican space layout is different from the European, in origin, since cities are planned in conjunction with the environment, with natural markers like rivers, lakes, mountains, which relate to the pyramidal base structure. The communal property mark is another substantial difference, since the eminently private property generates measurable and manageable physical limits, not so with the outdoor space in communal property, which is used by the entire community without

[1]Public Open Space is often referred to by urban planners and landscape architects by the acronym 'POS' with varied interpretations of the term, however for this research we use the term Public meaning a space available for public use and access, and the term Open meaning a space that is outdoors, not within a building.

actually belonging to anyone. The Pre-Hispanic cities are essentially a reflection of the cosmogonical vision of their creators and inhabitants, Valero (Valero, 2002) and Matos Moctezuma (Matos, 2010) mentioned.

The sacred space is the center of the village and its conformation is modeled on nature, therefore the town square surrounded by its pyramidal buildings replicates the natural space, implicitly sacred. Most of the Pre-Hispanic cities reproduce a POS with the surrounding buildings and these buildings are also strategically located at the center of these regions. This pattern is evident in Teotihuacan, where the shape of the pyramidal buildings presents an undoubtable relationship with the mountains behind them, integrating them into the view from the city center, so that space in the Pre-Hispanic city replicates the environment in which it is located, on a smaller scale. This apparent relationship that sets the design of foundations is mentioned by Chanfón (1997), Amador (n.d.), Marquina (1951), among others; Chanfón himself cites Gonzalez Aparicio's (1975) work, which relates the visual close off of different cities and the landforms around them.

This relationship between the POS of the viceroyalty of New Spain with its pre-Hispanic history is mentioned by Artigas (2001) and Kubler (1983), referring to religion, worship in POS. Chanfón also takes into account other factors such as climate, which configure the outdoor life and generate a closer coexistence with the environment and its observation (n.d.), and Novoa (1990) does too. In short, POS in Mesoamerica before the arrival of the Spanish was communal, outdoor, public, sacred and symbolic, shaping itself as the multifunctional place of the population, considering that religion used to govern all activities.

1st space: square of the ordinance

In the sixteenth century, the Spanish Crown began creating the functional and operational structure of the newly discovered lands, not only the evangelization represented a wielded argument for the justification of Hispanic action in New Spain, but also the realization of a utopian world, the construction of the city of God on earth was sought (Moro, Campanela & Bacon, 1941), product of humanist ideas of the Renaissance.

The sixteenth-century urbanism in America has a gradual development, intrinsic to its idealization; early attempts reflect an evolved culture from treaties and prevailing ideas. Later the geographical relationships of Philip II as well as the city ordinances would show the foundational tradition of the cities, which, curiously, by the time they were issued, the majority of cities in what is now Mexico and Central America had already been founded. The history of the Mexican model is sought at the first founding attempts in the Caribbean and Central America islands: "The Instructions to Pedrarias Dávila in 1513 and Cortés in 1523, let's us glimpse the notorious influence of readings of Vitruvius, St. Thomas Aquinas and of the European theorists of urbanism in the Renaissance, and announce, what in a more detailed and extensive manner would be exposed in the ordinance of Philip II in 1573..." (Wyrobisz, 1980).

In this context, if the city layouts are observed (those prior to the Mexican foundations), we'll notice some constants. For example, in the cases of Santo Domingo in the Dominican Republic, the Cuban cities founded in the sixteenth century as well as Panama the old, the town square is the configurator, it is the center of the cultural and social life of the people, these schemes didn't have the pre-Hispanic influence yet. Eduardo Tejeira cited the Instructions to Pedrarias and considered a paragraph, which was key in the study of urban planning. Taking into account the year of issue (1513) we can observe that it predates (60 years) the urban ordinances of Philip II (Tajeira, 1996):

The town square as the configuring model of space would present variations in the center zone of Mexico, the main variation is the union of POS with all its unique features, the triad of space: town square, courtyard of the convent and the convent`s orchard. The Mesoamerican configuring model was noticed by Rafael Lopez Guzman, who does a work of analysis on the geographical relations of Philip II focusing on the axis of urbanism and architecture (Lopez, 2007).

Again according to Lopez, the Hispanic and pre-Hispanic systems are amalgamated and are similar (Lopez, n.d.). In the mid 70s of the sixteenth century, there were two key documents to establish the importance of the town square in the model described: the

urban ordinances of Philip II included in the Laws of the Indies and the geographical relationships of the same monarch (Phillip II). In the ordinances, we can observe solid details that illustrate the political conception of the Town Square and requirements of the geographical relationships (Camarero &Campos, 1993).

These models of town square in Mexico have variations depending on the size of the city, e.g. in Mexico city, POSs are multiplied, due to its character of capital, we find that the large convents have atriums and orchards, and, since these cities have more than one convent, there are several cores of open public space. In Mexico, the atrium of San Francisco is mentioned in several chronicles (Cervantes, 1993).

It's important to note that the spaces of this size in the central areas of the city weren't common, this was noted by Cervantes de Salazar that the urban model in central areas of the city allowed to keep open many square meters for the evangelism activities (Cervantes, 1993), in this chronicle, Zuazo then describes the rationale for such a broad town square (Cervantes, 1993).

However schemes vary between the major cities, towns and villages. For Tovar y de Teresa, the city described by Cervantes is the Renaissance city, modified from the first trace by Viceroy Mendoza (Tovar, 1985).

Tovar addresses the work of Mc. Andrew and emphasizes the humanism of the first viceroy of New Spain, discussing the use of the seven conditions of an ideal city of Plato, for cities plotted or renovated and for the building of convents and their surrounding urbanism (Tovar, 1985). While those who design the cities try to respect the established models, the adaptation of these plans to the existing cultural patterns generate hybrid models; Toussaint mentions that Alonso García Bravo had already been in the expedition of Pedrarias Dávila in Central America, then he comes to Mexico and is selected by Cortés to design the city of Mexico; Garcia must've witnessed the city layouts made by Pedrarias, and despite the clear instructions, an adaptation to the pre-Hispanic layouts had to be done in Mexico. For Toussaint, the width of the streets, modules of urban blocks and the main axes and the main square were already given according to ditches or water canals, the left buildings and main roads; thus setting a Renaissance city with Hispanic roots (Toussaint, 1938), this can be seen in the layout of the current city.

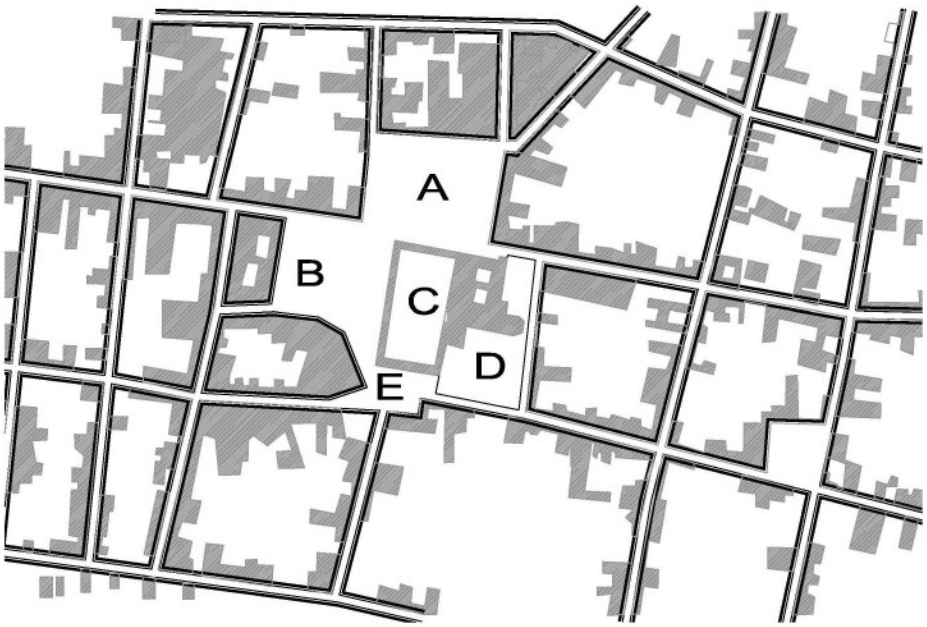
2nd space: the courtyard of the convent.

The construction of cities through the engineering would require of multiple specialists, a large number of them had emanated from the religious sphere. There are multiple references to the work of the friars in the construction and improvement of cities, friars such as Fray Antonio Bermul, Fray Juan Lazo, Fray Garcia de Cisneros and Fray Rodrigo de León. We can also find the Franciscans in 1545 (Kubler, n.d.). Ortiz Macedo mentioned about the monks: "They must've acquired training in the organization of the teams and the principles of construction, as only in rare occasions they took advice from builders (in reference to architects) and prime contractors" (Ortiz, 2004). The friars served as architects, engineers and planners (Escalante & Rubial, 2004). The monks built a social structure with an architectural urban physical framework, the criterion was to always teach people to live in "police force" term used to indicate the right way to live in towns and cities and coexisting peacefully within the rules and standards set, this concept included environmental improvements and land productivity, both activities were supported by engineering, all in a general Christian framework[2]. This meant showing that the land was transformed into a concept of modernity brought from Europe, which improves the life of people, "architecture that was just the means to spiritual immediate results" (Comez, 1989).

As a first aspect of the transformation of the land under the Spanish rule, performed mostly by the monks, there was: the delimitation of POS. This, we can see in Basalenque chronicles where he mentions what friars did about the foundation (De Basalenque, 1991).

Selecting the location depended on the previous organization that the territory had. The friars arrived to establish their organizational structures in the populations that already

[2]In the XVI century the word engineer defined a specialist who applied its ingenuity to perform various works. At that time, it wasn't yet used to define a profession.

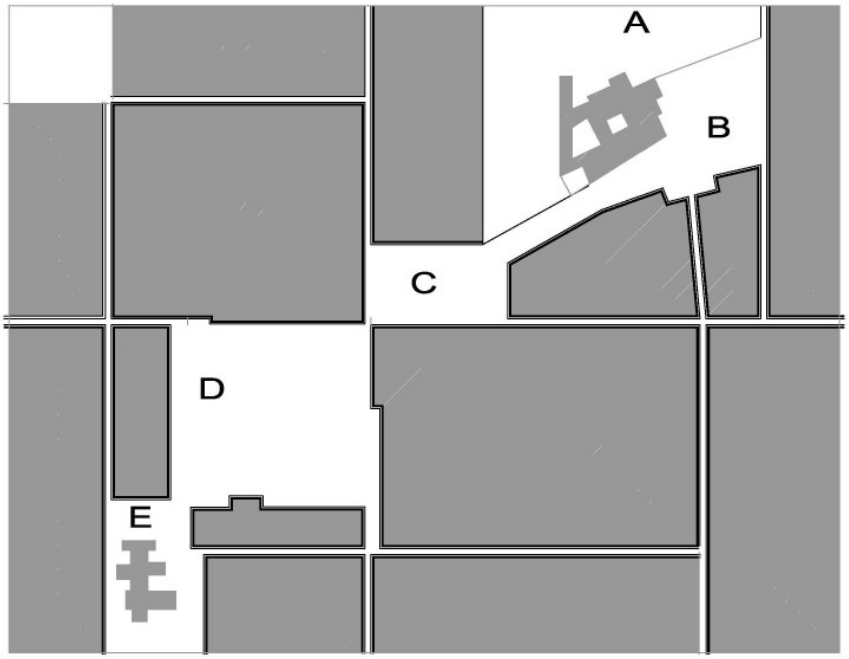


existed, or else, they chose new locations near population centers already established; e.g. Huejotzingo's renovation and Tlaxcala.

Buildings are essentially placed around the POS, which in turn are concentrating the population, the main activities are performed outdoors on these alternated spaces, the town square requested in the ordinances of 1573 (Wyrobisz, n.d.), the courtyards of the convents and the convent`s orchard. Some examples are: the aforementioned Tlaxcala (FIGURE 1), some cities in central Puebla founded by the Franciscans also have this arrangement, the description of Izamal (Yucatán). Late viceroyalty times, reflects this coexistence of POS, like in Ancona's description (Ancona, 1986), which shows three plazas on three sides of the convent, also considering a large atrium (8,600m2). Izamal shows even today this combination of spaces (FIGURE 2). Rafael Lopez Guzman mentioned on the analysis of urban layouts in two possible ways, one is as a theoretical structure that organizes space (Lopez, n.d.).

This layout and spatial configuration is also developed around the main POSs, as already mentioned with regard to the courtyards, a meeting place for different groups, who under the guidance of the friars assimilate all new knowledge. The drawing made by Fray Diego Valadez can't be ignore, it's a source of information regarding the operation of a courtyard of the sixteenth century used to evangelization; Chanfón also did a study of the engraving (Chanfon, 1994) (FIGURE 3). The description made by Mendieta of the pre-Hispanic sacred precincts, could be adjusted to the novo-Hispanic atrium, showing the survival of the model in the courtyards of the sixteenth century (De Mendieta, 2002).

This description of the large courtyard (the size is related to the importance of the village) fenced with gates to roads is formally equal to the great novo-Hispanic atriums located in front of the convent where it was easier to do the work of evangelization, Carlos Borromeo writings mentioned how a courtyard should be (Borromeo, 2010). This issue of "enclosing it" is recurrent in most of the Mexican examples, defining a space with particular characteristics for certain functions related to evangelization. Valadez cited by Palomera mentioned: "...to the indigenous peoples is usual to preach to them in the courtyards, which are very spacious…" (Palomera 1962). Activities in these areas must've been massive, with regard to this, Mendieta mentioned about the massive community baptisms in the patio of the monastery of Guacachula and in the one of Tlaxcala (De Mendieta, n.d.). Luis Weckmann also mentioned the multitudinous baptisms performed



in the early years of evangelization referring to Motolinia and Mendieta (n.d.). Likewise he refers to reports of baptisms of about 15,000 people in a day performed in Xochimilco by two priests (Weckmann, 1996). Regardless of the method used the space for these baptisms was the court of the convent.

In fact the concept of atrium is so important that Artigas identifies a separate type within the open chapels: the isolated open chapel with atrium, used as a guest chapel for the most important monasteries (Artigas, n.d.).

Other current layouts allow us to observe the space of the courtyard, which is often noted disproportionate to the rest of the layout, oversized spaces, in this order of ideas it's important to note the hypothesis of Huejotzingo's development, conducted by Cordova Tello, who based on archaeological explorations, describes the different construction stages, between the foundation and the convent as known today, which were all developed in the sixteenth century (Cordova, 1998), the only transcendental element is the empty space of the courtyard, which is constant, different from the convent buildings, chapels, basins and temple, which are the ones that suffer the most changes.

It's also important to mention regarding Huejotzingo, that the layout and the great sacred space have an evident communication still today, the size of these spaces remind us of the importance of the manorialism in pre-Hispanic times. The architectural urban arrangement of space will have variations according to the regions, the proportions of town squares and atriums change. This, according to the ordinances, has to do with the number of inhabitants, therefore it is possible to infer the population centers that had more inhabitants, e.g. Tepeaca, Tecalli, Acatzingo, Huejotzingo in Puebla and Atlatlahucan in Morelos, among others (FIGURE 4). Some examples are the differences between the Franciscan establishments in what today is Puebla and the Augustinian sets in the current state of Hidalgo.

Another case of interest are the hospital towns, in Santa Fe de la Laguna (Santa Fe of the lake), where we can observe that the streets converge towards the main square, which in turn is aligned by an axis with the parish, and behind it we'll find the Hospital with its central space. Tiripetio is conformed with the various buildings required (De Basalenque, 1991).

These socio-urban utopias conform units that organize the architectural space around town squares and streets, the hospital town conceived as the space where the utopias are performed is promoted by Quiroga Artigas, who quotes a description of what a hospital town was (Artigas, 2001).

Using space as a tool is a quite clear vision which Quiroga had, its the stage where you can do all the altruistic utopian activities, the view was shared and was implicit in the spatial conception of the XVI century. Vasco de Quiroga mentioned in the ordinances for hospital towns, the difference between urban and rustic "families", however families were not the social structure we know today, in the context of these ordinances, families are the dwellings, i.e. the residential building (Vasco de Quiroga, 2003). While the atrium is the stage meant to convey knowledge related to the new way of life, the third POS is used for transfering knowledge of other fields such as engineering and technology, i.e. the orchard of the convent, which remains attached to the convents and provides the stage for acclimating plants, teach complementary planting and irrigation techniques among other activities.

3rd space: the orchards of the convent.

To evangelize, understood as an obligation by the Crown entailed not only the knowledge of Christianity but also to bring in to America all the improvements of the European way of life. Evangelization models also incorporated irrigation techniques, services, new species of plants, technologies, among alia; Chanfón quotes Diego Valadez: "In the areas, quite marvelous fountains flow, where children wash impurities from the body, because first of all they are taught cleanliness standards" (Chanfon, n.d.).

These concepts can be seen in the carving of the stone cornice located at the fountain of Tepeapulco of the sixteenth century "When Don Antonio de Mendoza was viceroy and Carlos V a Tlatoani[3], with Don Diego de Velázquez as the governor, true faith and the immaculate God came for water". We can also use the phrase of the famous priest Tembleque[4], quoted by González Lobo: " lets evangelize... get water... because only healthy people can understand and love God..."[5]. Water and irrigation are linked to the three spaces studied, they are conceived within the engineering of POS, this is evangelism through the infrastructure therefore propping up a new way of life, it is one of the most important tools for acculturation used by the friars, in this scope, the orchards of the convent also met different functions, supporting the aforementioned processes and enabling the generation of products for their own consumption.

The first monastic establishments in what is now Mexico, are designed with large orchards, Fray Diego Valadez cited by Chanfon describes the architectural scheme of these sets; he also later writes letting us glimpse another vital use in the architectural scheme: "The need to adapt new plants and food crops made the orchard of the convent necessary" (Chanfon, n.d.).

Double spaces, one in front for evangelism and the other in the back or aside to the whole set for teaching of technical issues, the acclimatization and self consumption conform a POS located around the original core: "they were genuine experimental fields for new crops and were the spaces where indigenous people learned to know and cultivate new products" (Escalante, 2004). This model that combines the large spaces described in this work, can be observed in the prototype of the Franciscan convent, in Tlaxcala Tepeyanco (FIGURE 5).

This function of acclimatization of plants and their subsequent distribution was very important in the process of introducing European species that were later on incorporated into the diets of the inhabitants of New Spain on two premises: the first, to keep the diets of European citizens and the second, to accustom the indigenous people to these new products. Comes mentioned the work of evangelization supported in the construction and improvement projects as well as productive activities as a model previously tested in Europe by the Cistercian; these activities have a dual purpose, to evangelize and for land amelioration to make it more productive (Comez, n.d.).

The gardens and orchards had a lot of design work, plants and trees were placed to

[3]Tlatuhuani in Nahualt, it often refears to a king, however it's closer to an emperor because a Tlatoani was elected.

[4]Extraordinary hydraulic engineer who belonged to Franciscan order.

[5]Lapida inaugural en la caja de agua de Tepeapulco, Hidalgo.

create pleasant spaces; water was always linked to them, and the amount of vegetation made this spaces appropriate for recreation, thus we can now link one more function to those already described: orchards as spaces for recreation, which is why it is not uncommon to find balconies of several buildings facing the spaces belonging to the orchards. With the arrival of the Dominicans to Oaxaca: "On July 24th, 1529, Mayor Juan Peláez agreed with his council to give Solars to neighbors and residents of the City of Oaxaca granting the Dominican monastery 12 Solars for its home, assistance and its need for having an orchard where they could have recreation and livelihood" (Herrera, 1998).

At this point we can add another function located in the orchards: manufacturing, e.g. in Santo Domingo in Oaxaca there is a ceramic oven (Gomez & Fernandes, 1998); Kilns for quicklime with troughs to turn the mixture off and a some oversized buddles described by Burgoa, the buddles and the kilns for quicklime could be used to make clay bricks (Fernandez et. al., 1998). This aren't isolated examples, the ponds for fish farming as the one found in Cuahutinchan Puebla, and the flourmill in the orchard of Cuilapan in Oaxaca are examples of these spaces with a mainly agricultural vocation however they could also accept areas for production, factories and workshops. On this particular case we found in the chronic of Michoacan a description of the ponds from Yuriria (De Escovar, 1991). There are references to the construction of mills associated with orchards in key documents such as the Treaty of hydraulics of the XVI (Turriano, 1993) of Pedro Juan de Lastanosa[6], as the water used by a mill can then be exploited in irrigation. Most of these irrigation systems included in the orchards were combined, from the Muslim gravity irrigation technique (Trilllo, 2002), to the pre-Hispanic management of canals and ditches.

Within the garden as a place for physical exercise, meditation and prayer we may find the particular connotations as accorded by the Carmelites, mentioning within the rule: the construction of chapels in orchards for retirement, emulating the eremitical origins of the order. Thus we find in the "Holy Carmelita of Cuajimalpa desert" the building of chapels for the retirements, from which a great number of them still remain in the woods, one of the characteristics of these hermitages was its sustainability, Medina Ramos expressed. They outweigh the dwellings because they were totally self-sufficient, i.e. they had their own services, such as a small orchard, kitchen, bedroom and oratory" (Ramos, 2008). We can appreciate that the private garden is for the monk's subsistence, who does exercise

[6]Also known as: The twenty one books of the ingenious inventions and machines of Juanelo Turriano

inside this space, the inhabitants were in charge of taking care of it, this way they took care of it whilst doing their exercise.

At different times, the same orchard could have different functions, what used to be an orchard for acclimatization in the sixteenth century could have been an orchard for livelihood in subsequent centuries. At this point it is appropriate to name the uses discussed here: acclimatization of plants, self consumption, employment of community members, the issues arising from the rules themselves, as places of meditation, exercise and retirement and areas of production and processing.

In the case of the Jesuits orchards, derivative of the work done by Marti (Marti, 2010) and Loreto (Loreto, 2005), with regard to the schedules that the students complied, it can be inferred that they weren't used for didactic or compulsory labor purposes, they were only used as a means of subsistence and recreation, the coadjutors designed them as production units, this makes them particularly interesting, the Jesuits orchards are production units well defined, it isn't surprising they have irrigation systems, production areas and croplands: "More than for rest and recreation of the students, orchards were used for farming and breeding of domestic animals. It's true that not all schools had orchards, but they all at least had a small farm that helped its economy and maintenance..." (Revuelta, 1998). The description allows us to perceive the Jesuit orchard as a multipurpose space designed for farming, and not only as a formative workspace.

Conclusion

The morphological reading of today's cities shows within its layout, its origin and evolution, this way we can distinguish the major urban centers in the novo-Hispanic structure from the regional and secondary towns, setting notable differences in the use of POS. While in secondary towns a large central space is shown, in major cities, space is articulated through various fragmented spaces in various areas configured around the large central square of the city, marking neighborhoods and areas that in an atomized way reproduce the scheme of the POS analyzed. The ratio of built space and the POS is uneven showing a particular regionalism that can only be understood through a strong relationship with its pre-Hispanic component. The triad of POS: town square, courtyard of the convent and orchard of the monastery, were the axis and the stage of evangelization and miscegenation, leaving an indelible mark on contemporary Mexican culture, a lover of all sorts of outdoor events; these radically transformed spaces, can be read in the current layouts, showing a very different picture to the one they originally had, the Mexican viceroyalty urban scheme is thus a hybrid and mongrel scheme.

References

Ancona Mena, R. (1985) 'Izamal Yucatán: su evolución urbano arquitectónica', *Cuadernos de arquitectura virreinal* 14 14-29.
Artigas Hernández, J. B. (2001). *Arquitectura a cielo abierto en Iberoamérica como un invariante continental* (Grupo Editorial Tomo SA de CV, México).
Camarero Bullón, C. y Campos, J. (dir.) (1993) *Obras Hidráulicas en América colonial* (Ministerio de Obras Publicas Transportes y Medio Ambiente, CEHOPU, Madrid).
Cervantes de Salazar, F. (1993) *México en 1554* (Universidad Nacional Autónoma de México, México).
Chanfón Olmos, C. (1994) *Arquitectura del siglo XVI: Colección Temas escogidos* (Facultad de Arquitectura de la Universidad Nacional Autónoma de México, México).
Comez, R. (1989) *Arquitectura y Feudalismo en México: Los comienzos del arte Novohispano en el siglo XVI.* (Universidad Nacional Autónoma de México, México).
De Basalenque D. (1991) 'Historia de la provincia de San Nicolás de Tolentino de Michoacán del Orden de San Agustín. México 1673', in Gómez de Orozco, F (Introducción y notas) *Crónicas de Michoacán* (Universidad Nacional Autónoma de México, México).
Fernández Dávila, E., et.al., (1998) 'La producción de cal en los hornos de Santo Do-

mingo de Oaxaca', Fernández Dávila, E. & Gómez Serafin, S. (coord.) *Primer Congreso Nacional de Arqueología Histórica* (Consejo Nacional para la Cultura y las Artes, Instituto Nacional de Antropología e Historia) 149-158.
Kubler, G. (1983) *Arquitectura Mexicana Del Siglo XVI* (Fondo de Cultura Económica, México).
Mendieta, G. (2002) *Historia eclesiástica indiana* (Consejo Nacional para la Cultura y las Artes, México).
Mier y Terán Rocha, L. (2005) *La primera traza de la ciudad de México 1524-1535, Tomo I* (Universidad Autónoma Metropolitana, Fondo de Cultura Económica, México).
Ortiz Macedo, L. (2004) *La historia del arquitecto mexicano siglos XVI-XX* (Grupo Editorial Proyección de México, México).
Ramos Medina, M. (2008) *El Carmelo Novohispano.* (Centro de Estudios de Historia de México Carso, México).
Revuelta Gonzalez, M. (1998) *Los colegios jesuitas y su tradición educativa 1868-1906.* (Universidad Pontífica de Comillas, Madrid).
Toussaint, M. (1938) 'Introducción al estudio histórico de los planos', in Toussaint, M.; Gómez de Orozco, F. y Fernández, J., *Planos de la ciudad de México siglos xvi y xvii estudio histórico, urbanístico y bibliográfico,* (México Instituto de Investigaciones Estéticas Universidad Nacional Autónoma de México) 19-31.
Tovar de Teresa, G. (1985) 'Antonio de Mendoza y el urbanismo en México', *Cuadernos de Arquitectura Virreina*l 2, 2-19.
Trillo San José, C. (2002) 'El agua en al-Andalus: una explicación social de los espcios irrigados', *Ingenieria Hispano Musulmana* (Colegio de Ingenieros de caminos, canales y puertos, Madrid) 199-222.
Vasco de Quiroga. (2003) *La Utopía en América,* Serrano Gassent, P. (ed.) (Colección Crónicas de América, Dastin historia, Madrid) 264.
Tomas Moro, T. & Campanela, F. B. (1941) *Utopías del renacimiento*. Imaz, E. (ed.). (México: Fondo de Cultura Económica, México)
Wyrobisz, A. (1980) 'La ordenanza de Felipe II del año 1573 y la construcción de ciudades coloniales españolas en la América', *Estudios Latinoamericanos* 7, 11-34.

Retail Management to Revitalize Inner Cities. Big Boxes and Detached Centres

Silke Weidner, Tanja Korzer
BTU Cottbus-Senftenberg, Faculty of architecture, civil engineering and urban planning, Konrad-Wachsmann-Allee 2, 03046 Cottbus, Germany
Department of Urban Development and Construction Management, University of Leipzig, Grimmaische Strasse 12, 04109 Leipzig
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Abstract

There are different ways to revitalize Inner Cities. One widely used concept is to integrate Shopping Centres in the City Center. But we can realize that the Shopping Centre as a big box is nearly pasted. The new generation of Shopping Centres found their path from the suburban areas since around about 15 years more and more as new urban elements in our inner City Centres.

This Development can show on the basis of different Examples (national and international): on the one hand side of different German Shopping Centres (like a big box) and their accompanying problems of integrating and on the other side of other European countries like the UK and the Netherlands which show interesting examples of the new generation: common characteristic are the detached building structure, the huge sales floor: and in some case studies the function as THE city center (historic centers are destroyed for example).

In spite of the reasonable Shopping Centre integration examples in terms of the urban structure, public and private space can no longer be identified – private owners but public use: who is responsible for what? Who says what is allowed and what forbidden?! So we get new questions and challenges with this new kind of shopping development!

Introduction

City cities are places of retail. Competition in the retail sector for customers, attractive locations and efficient marketing strategies is fierce. In recent years, many towns and cities in search of new drive have granted planning permission for shopping malls in their centres. But the problems of many central locations such as declining customer footfall and trading-down tendencies (a shift towards cheaper, poorer quality goods) cannot be solved merely by the arrival of a new shopping centre. Numerous examples in German cities show that a new mall in the inner city can spark new competition in a confined area. Spatially and structurally opening up shopping centres and connecting them to traditional retail locations and the urban surroundings can have a very beneficial impact. Furthermore, new synergy can be tapped by transferring experience from shopping centre management to the development of other inner-city retail locations.

Methodology

The findings in this paper result from various analytical steps. A thorough literature review formed the basis for the description of individual development stages and the initial situation (focusing in particular on the German market). Current changes were examined by means of empirically based international case studies involving mapping, plan analysis etc.

Development of shopping centre types in Germany

Although the first shopping centres were built in the USA back in the 1920s, they only began to emerge in Germany in the mid-1960s (1964: Main-Taunus-Zentrum near Frankfurt am Main with lettable space of about 42,000 sqm [today around 82,000 sqm][1] and Ruhrpark on the A40 motorway between Bochum and Dortmund with lettable space of approximately 23,000 sqm [nowadays about 125,000 sqm][2]). The American idea of replicating the spatial and atmospheric characteristics of the European town[3] was also adopted for the first generation of shopping centres in Germany[4]. The only parameter which was altered for the German market was size.

Between 1964 and 1973, shopping malls were often built in suburban locations with good transport links. Examples include the Franken-Zentrum in Nürnberg-Langwasser, the Elbe-Einkaufszentrum and the Alstertal-Einkaufszentrum (nowadays with retail space of 40,000 sqm, 33,000 sqm and 59,000 sqm, respectively). They were often built on one level and combined an open design with simple, unpretentious architecture. By building them on non-integrated greenfield sites, there was plenty of room for large car parks. The shops which proved to be the biggest draws were department stores. The development of these shopping centre projects was concentrated in large conurbations such as Rhine–Ruhr, Rhein–Main, Stuttgart, Nuremberg, Hamburg and West Berlin[5].

In the second generation of shopping centres (1973–82), the patterns of development in the USA and Germany began to diverge. Fundamental differences began to emerge between the two countries especially in terms of size, location, quantity and the social environment, making comparison difficult[6].

Second-generation shopping centres were chiefly built in inner-city locations, albeit with barely any links to their urban surroundings. Even so, their architecture was more sophisticated than the first-generation centres. A simple, closed style prevailed contain-

[1]See EHI 2006: 374.
[2]See EHI 2006: 318
[3]See GRUEN/SMITH 1960: 11
[4]The classification of shopping-centre generations (content and time) is based on the findings of FALK.
[5]See HEINEBERG 2000: 181
[6]See HAHN 2002: 150

ing shopping streets on two or more storeys. Moreover, the inclusion of other functions increased, retail space being augmented by for example housing, offices and doctors' surgeries. Hypermarkets became anchor tenants in some cases, while in other city-centre locations the concept of traditional anchor tenants was abandoned.

In the early 1980s, the development of shopping centres with a regional impact stagnated owing to both the general decline of retail and also legal restrictions (BauNVO Building Regulations/BauGB Building Code) regarding planning approval for large shopping centre projects[7].

This trend was reversed with the third wave of shopping centres (1982–92), built almost exclusively in inner cities. The average size of projects declined as a result with retail space dropping from an average of originally about 58,000 sqm to approximately 15,000–25,000 sqm[8], while more attention was paid to architectural design and quality. As a result, mainly closed centres were built featuring for instance glass canopies and high-quality materials in the interior (e.g. the Löhr-Center in Koblenz and Weserpark in Bremen). In addition, image-building measures and the integration of leisure amenities and corporate identity became more important in the management and operation of shopping centres. Hypermarkets and specialist stores prevailed as anchor tenants.

The fourth generation of shopping centres (1992–2001) was marked by various parallel development trends. On the one hand, additional inner-city malls were developed in the form of shopping arcades and galleries while existing shopping centres were revitalized. Much emphasis was placed on their interior design, such as lighting effects, fountains, and areas containing seating and greenery. On the other hand, in the wake of German reunification, many large shopping centres were built in eastern Germany in non-integrated locations such as Saale-Park (since renamed Nova Eventis) in Günthersdorf (1991) with 125,000 sqm of floor space, Chemnitz Center in Röhrsdorf (1992) containing 82,540 sqm of floor space, and Elbe-Park in Hermsdorf (1993) with 60,000 sqm of floor space. Here, too, the trend continued for multifunctional use and the integration of additional amenities. The focus on creating a 'shopping experience' was supported by increased emphasis on convenience services such as childcare, the loan of buggies and wheelchairs, and the publication of a customer magazine.

Continuing the four generations defined after FALK, BESEMER and STURM[9] (and others) identify a fifth generation of shopping centres since 2000/01 characterized by the repeated focus on inner-city locations and the site-specific development of centre projects of various sizes. The focus on inner-city locations is increasingly accompanied by attempts to harmonize with the surrounding urban space and architecture. In addition to meeting basic demands, increasing emphasis continues to be placed on satisfying emotional and social needs. The integration of leisure and entertainment elements accounts for a growing share of shopping centres' offerings (e.g. through the incorporation of leisure facilities and live entertainment). Event orientation and atmospheric design are supported by thematic, centre-specific architecture with the aims of encouraging shoppers to stay for as long as possible and to boost customer loyalty[10].

Urban structural analysis and integration of different generations of shopping centres

This classification of shopping centre generations (first to fifth from 1964 to about 2008[11]) now needs to be considered and expanded, particularly in an international context. The following examples (see also Figures 1–3) show the different centre philosophies by means of ground plans of city centres and compare their structural alignment in terms of cubic and (public) space as well as their more or less central location and integration

[7]See SCHMITZ/FEDERWISCH 2005: 18

[8]See JAECK 1998: 35

[9]See BESEMER 2004:73f.; STURM 2006: 78

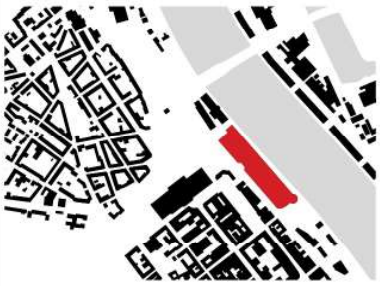
[10]Astonishingly, in a survey of shopping centre tenants, sales at city-centre locations were rated among the worst compared to greenfield and borough locations [see ECOSTRA 2011: 38]

[11]KORZER 2012: 72ff

Figure 1. Examples of closed shopping centres from different development eras (own diagram)[1]

[1]WEIDNER 2015: 226

closed centers

City/centre	*Characteristics*	*Typology/structure*
Bautzen Kornmarkt Center[1] 1998 - 2000 9.000 sqm 70 P 330	• 'Old' type, functions owing to the lack of amenities in the city's surroundings • Combination of local supply, cafés and restaurants, and services	
Ludwigshafen Rhein-Galerie[2] 2008 - 2010 30.000 m² 130 P 1.400	• Gold Certificate awarded by the DGNB German Sustainable Building Council for sustainable planning and outstanding integration into the urban surroundings	

Construction period/opening | Retail space | No. of shops | P No. of parking spaces | Drawings not to scale

[1] ECE Projektmanagement G.m.b.H. & Co. KG (o.J.) (a)
[2] ECE Projektmanagement G.m.b.H. & Co. KG (o.J.) (b)

into their surroundings. They range from traditional closed 'boxes' and the first open centres to the 'retail quarters' now emerging. A closed centre means an introverted functional orientation inside a building envelope which has little contact with its surroundings and which is detached from the urban context.

A look at shopping centres in for example the Netherlands and the UK as well as the last two German examples in Fig. 2 reveals the latest generation. CHRIST and PESCH refer to them as StadtCenter ('CityCentres'), although another apt term introduced here might be 'retail quarters'. Important new aspects about this generation include the immense size of these inner-city projects (see Liverpool with 130,000 sqm retail space and Bath with 37,000 sqm retail space as 'urban redevelopment projects'; Fig. 3), their positioning completely surrounded by existing building stock with the incorporation of historical streetscapes and construction areas, and the (further) dissolution of large cubature into individual elements (initial examples in Germany include Kamp-Promenaden and Clemens Galerie; see Fig. 2). This prompts other (research) questions such as whether the space between the sections can be classed as public or private urban space as well as concerning the rights, responsibilities, opportunities and freedoms demanded and offered by these spaces. The question of the combination of functions is still relevant: while some shopping centres which have integrated housing as well as social and recreational infrastructure alongside retail in order to obtain planning approval (in other words to win over public opinion) still have major problems (one example being Düsseldorf-Bilk), the latest examples appear to have conceptually addressed this mix of uses right from the

Figure 2. Examples of recently built and planned open shopping centres (own diagram)[1]

[1]WEIDNER 2015: 227

open centers

City/centre	*Characteristics*	*Typology/structure*
Solingen Clemens-Galerien[3] 1998 - 2000 14.000 sqm 55 P 550	• One of the first open shopping centres in Germany • Direct connection to the prime location • Integrated multiplex cinema, office space, training institutes and library	
Osnabrück Kamp-Promenade[4] 2002 - 2004 13.000 sqm 20 P 250	• Functionally integrated into urban surroundings • Closely networked with urban environment, direct connection to the prime location • Consists of four individual buildings • Several awards	
Leipzig Höfe am Brühl[5] 2010 - 2012 27.500 sqm 130 P 820	• Architectural references to historical location of former Konsum department stor • Reflects system of arcades and courtyards typical of central Leipzig	

Construction period/opening | Retail space | No. of shops | P No. of parking spaces | Drawings not to scale

[3] Werbegemeinschaft Clemens Galerien GbR (o.J.)
[4] Multi Development Germany GmbH (o.J.)
[5] mfi Management für Immobilien AG (o.J.)

start instead of resorting to it later. This approach could thus function as a piece of city, an urban building block, and be regarded as promising from various angles. However, this hypothesis lacks solid observations of the impact of the current generation of shopping centres. One positive aspect is at least that these integrated district developments ('retail quarters') are replacing the largely monofunctional 'pure centres' as a greenfield format, which would be unsuitable as they were developed for a totally different environment (easy availability of land, accessible only by car, no architectural expectations).

Shopping centres and public space

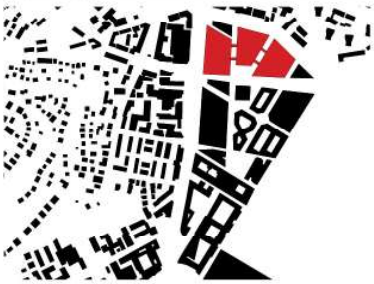
As set out above, "Public space is the constitutive element of European cities"[12]. It is the stage for what is commonly referred to as urban public life. Nevertheless, recently

[12]BREUER 2003: 11. (Translation by the authors.)

Figure 3. Examples of 'retail quarters' outside Germany (own diagram)[1]

[1]WEIDNER 2015: 229

Transition from open centres to retail quarters

City/centre	*Characteristics*	*Typology/structure*
Stuttgart Milaneo[6] voraus. 2015 43.000 sqm 200 P 1.680	• Integrated into urban surroundings through individual structure • Combination of housing, local supply, cafés and restaurants, leisure amenities, services and hotel	
Mainz Einkaufsquartier Ludwigsstraße[7] 2015 - 2018 26.500 sqm 100 P 400	• New urban district • Functionally integrated into the urban surroundings • Consists of five individual buildings	

Construction period/opening | Retail space | No. of shops | P No. of parking spaces | Drawings not to scale

[6] ECE Projektmanagement G.m.b.H. & Co. KG (2014) (c)
[7] ECE Projektmanagement G.m.b.H. & Co. KG (2014) (d)

the loss or change of public space and the urbanity taking place within it have been debated[13].

Shopping centres play a special role in this regard "as after all they contain the enclosure of the founding function of the European city and the central use of its public space, namely the market." However, the framework has changed fundamentally, for a significant proportion of retail now takes place on private premises[14]. How will this new relationship of tension – public space vs. public life in the (private) shopping centre – affect a city's urbanity?

The urbanity of an urban area is primarily determined by the differentiation ability[15], which Siebel dubs 'urban difference'. The requirements for this are the distance and indifference of the 'city dweller' and the spatial segregation of interests and uses of urban residents. The resulting temporal and spatial homogeneity provides people and functions for example with the possibility to realize common interests, pursue the same religious views, or form agglomerations of factories or shops in the same economic sector. Seen thus, urbanity and public life are the result of differentiated social relations based on the division of labour.

In this respect, the shopping centre can be regarded as a single urban building block – a homogeneous, (semi-) private space which can be accessed only by a selected seg-

[13]See HÄUSSERMANN et al 1987; BBR 2003; WÜSTENROT STIFTUNG 2005

[14]CHRIST is even of the opinion that apart from their function as a place of retail and work, "Shopping centres ... [are] perhaps these days the only remaining place where urban society can at least physically meet informally and across all social strata and cultures under one roof." [CHRIST 2008: 10] (Translation by the authors)

[15]See also LEVEBVRE 2003:223ff.; KASCHUBA 2005: 14

ment of the population. The mall within the centre is a place of deliberate segregation. Nevertheless, with the aim of maximizing its profit, the shopping centre is keen to appeal to and retain as many affluent customers as possible. Consequently, the architectural design and the range of goods and services offered are aimed at a broad demographic[16].

For this purpose, to some extent the shopping centre reproduces urban space without being able to be a real city[17]. Being a "substitute city"[18], a shopping centre is devoted exclusively to consumption. It hence responds to the current trend of consumption as the "central instance of socialization"[19] within society. Shopping is no longer simply a matter of stocking up on the necessities. In addition, it is partly about the desire to "go for a stroll, look at and touch things, try them on and out with no obligation, purely passing the time, unsurpassed luxury"[20] and also the definition of the "social stock of those individuals observing themselves"[21]. "Consumption has become the medium of a culture of the self"[22]. With regard to the city, this means that: "Shopping today is the last public act – and thus the real organizing principle of a city. It is the only energy that still allows urbanity to be experienced"[23].

However, there is still a vital difference between a shopping centre and the urban context[24]. It lies primarily in the way in which the space of the shopping centre is produced. The centre is a "centrally planned, dictatorially managed enterprise"[25]. SIEBEL calls this planning practice the "God-father model". The Shopping Centre "is a potentially completely controlled environment in which the exterior, the architecture, internal organization, design, range of goods, tenant mix and customer access, internal climate and lighting can all be optimized towards the goal of profit maximization." The control aspect has a special part to play above all in the debate about public space versus private space within the shopping centre.

In recent years, the mall and the city centre or the inner-city pedestrian precinct have moved closer together with respect to their functions, the city centre primarily acquiring parts of the principles of shopping centre operation. One pertinent example is the progressive "privatization" of the city centre. The privatization of public space takes the form of various types of social control. One important reason for this is the growing competition between traditional retail locations and the retail offerings in shopping centres. In the competition for customers, the safety and hence the attractiveness of the city for specific target groups (e.g. wealthy customers and tourists) takes centre stage in urban policy.

[16]Market research preceding the planning of a shopping centre is described by KOWINSKI as a quasi-democratic process. "The citizens vote via the market study, and the mall government responds." [KOWINSKI 1985: 76] BAREIS puts it like this: "Although it is hardly possible based on shopping malls to talk of public space in a direct sense, they do not constitute the opposite of them. In a type of 'doing public', parts of practices and discourses produce a space which can be regarded as public, while in a 'doing private' the same persons or others practise an 'extended living room' in defined parts of the mall (an ice cream parlour, a bakery)." [BAREIS 2007: 167] (Translation by the authors)

[17]See AXTHELM 1995: 63

[18]LEGNARO, BIRENHEIDE 2005: 100

[19]HELLMANN 2008: 26f

[20]Ibid.: 7; see also GERHARD 1998: 1. (Translation by the authors)

[21]HELLMANN 2005: 13. (Translation by the authors.)

[22]BOLZ 2002: 102. (Translation by the authors.)

[23]BOLZ 2002: 117. Rem KOOLHAAS tables the thesis that public life is these days largely realized via consumption. "Shopping is arguably the last remaining form of public activity. Through a battery of increasingly predatory forms, shopping has infiltrated, colonized, and even replaced almost every aspect of urban life." [DÖRHÖFER 2008: 11.] HÄUSSERMANN also talks in this connection of the "consumption-determined surrogate of urbanity" [HÄUSSERMANN 1987: 216]

[24]The emergence of urban spatial and functional structures is based "on unforeseeable contingencies and democratic decision-making processes of many different citizens." [SIEVERS 2006: 9] (Translation by the authors)

[25]AXTHELM 1995: 63

New challenge: Suburban, urban, virtual retail?

With research into city-centre retail development in recent years largely addressing competition between traditional small-scale and large-scale retail locations, a new factor has emerged: e-commerce. This raises a totally new question: How can the entire fixed-location retail sector – shopping centres, owner-operated retail, department stores and chain stores – respond to the possibilities of online commerce? Growth in online sales is expected to be so enormous that it is bound to have a significant impact on footfall and shoppers' behaviour, regardless of the types of shopping formats in future city centres. The question about public space and its changed significance and design needs to be raised in this context, too.

A handful of figures vividly show the dominant position already achieved by e-commerce in Germany. In 2012, price-adjusted retail sales totalled around €428 billion (slightly below the previous year's level). Online retail generated total sales of €29.5 billion, an increase of 13% on the previous year and twice as much as in 2005. Hence by 2012, online retail accounted for nearly 7% of total retail sales. To date, although growth in e-commerce has above all replaced traditional catalogue sales, online sales are forecast to reach about 27%[26] of total retail, meaning a significant shift from fixed-location to online retail. Accordingly, the question regarding the type and also the placement of local retail offerings (location, property, function) needs to be examined. Both shopping centres and owner-operated retail will be affected. It seems likely that the functions, the physical structures housing them, and the associated networking (transport, logistics) will be rearranged – a prospect which currently raises more questions than answers:

- Will retailers and customers switch entirely to online commerce – and if not, how big will the various platforms used in multichannel marketing be?
- Why will we need fixed-location retail in the future? What will it be used for?
- What features will exist in what sort of structures? Will there be both small city-centre units (showrooms) and large suburban boxes (logistics centres) with a regional dimension?
- Will urban logistics have to be rethought? Will a pneumatic dispatch system have to be installed for the numerous packages and parcels delivered to private households?
- Will sites be required for urban returns centres (and in what 'network')?
- What form will the much-cited increased focus on experience in city-centre retail take? How will the requirements regarding architecture and interiors change as a result?

The unabated strong demand among investors for future retail space and the arrival on the market of numerous foreign players demonstrate the importance of the German market and underline its attractiveness to investors. The aim should be to ensure that the huge sums of money involved are invested in high-quality projects. Accordingly, the use of urban planning and regulatory policy taking into account discernible trends is strongly recommended. The city (and hence urban planning) and retail are inextricably linked, and when something happens on one side of the equation, the other side must either follow suit or take counteraction – for neither side can escape the other[27].

Conclusion

Regarding the development of retail districts as (new) urban building blocks as well as the strategic response to online competition, urban management has a vital role to play regarding public space. Aspects of quarter management can be borrowed and combined with elements of centre management. Owing to their strict management, shopping centres provide examples of how to liven up retail space and other inner-city areas, encouraging other retailers (often in conjunction with city marketing and urban management organizations) to stage similar activities (e.g. street festivals combined with sales or thematic marketing campaigns). "The shopping mall, despite being a perfect

[26]BEYERLE et al. 2013
[27]SCHRETZENMAYR 2011: 71

example for the loss of public space, will increasingly become a model for the design of urban spaces."

What this boils down to is a "professional optimization"[28] or a constant modernization process in order to maintain or improve the attractiveness and appeal of inner cities as well as their formative character. MONHEIM refers in this regard to two complementary possibilities: 'place making' and a form of destination management based on 'cooperatition'[29]. 'Place making' means the qualification of spaces through the interaction of material, symbolic and socio-spatial conditions, while 'cooperatition' describes the cooperation between different actors under competitive conditions[30].

Seen thus, the shopping centre and its main concepts could enrich the city both socially and spatio-functionally and contribute to the stabilization of the enhanced role of inner cities[31]. But this depends on two essential conditions being met. Firstly, efforts must be made to continue the good work already done on the architectural and functional integration of the shopping mall into the urban space. And secondly, the 'urban difference' of the city must be maintained or further developed accordingly as society's demands change. All the city's actors must rise to the challenge: local politicians, urban planners, investors and project developers, shopping centre managers – as well as customers and visitors to the city.

References

Hoffmann-Axthelm, D. (1995) 'Das Einkaufszentrum', in: Fuchs, G.; Moltmann, B. and Prigge, W. (ed.) *Mythos Metropole* (Suhrkamp, Frankfurt am Main) 63 – 72.

Bareis, E. (2007) '*Urbane Shoppingmalls und Subjektivitäten*' in: Wehrheim, J. (ed.) '*Shoppingmalls – Interdisziplinäre Betrachtungen eines neuen Raumtyps*' (VS Verlag für Sozialwissenschaften/GWV Fachverlage GmbH, Wiesbaden) 153 – 171.

BBR (2003) '*Öffentlicher Raum und Stadtgestalt*' (1/2 2003, Bundesamt für Bauwesen und Raumordnung (BBR), Bonn).

Besemer, S. (2004) '*Shopping-Center der Zukunft. Planung und Gestaltung*' (Deutscher Universitätsverlag, GWV Fachverlage GmbH, Wiesbaden).

Beyerle, T.; Weber, H. and Tausch M. (2013) 'Retail-Logistik Deutschland. *Einzelhandelsimmobilienmarkt 2025*.' (Published by IVG Immobilien AG, http://www.ivg.de/fileadmin/internet/daten/redakteur/dokumente/2013/Research/IVG_Research_Retail markt_2025.pdf) accessed 13 March 2014.

Bolz, N. (2002) '*Das konsumistische Manifest*.' (Wilhelm Fink Verlag, München).

Breuer, B. (2003) '*Öffentlicher Raum – ein multidimensionales Thema*' in: BBR (2003): '*Öffentlicher Raum und Stadtgestalt, Informationen zur Raumentwicklung*' (1/2 2003 Bundesamt für Bauwesen und Raumordnung BBR, Bonn) 5 – 20.

Christ, W. (2008) '*Baukultur für den Konsum*' in: Bundesarchitektenkammer (ed.): 'Deutsches Architektenblatt' (Ost 12/08, corps. Corporate Publishing Services GmbH, Düsseldorf).

Dörhöfer, K. (2008) '*Shoppingmalls und neue Einkaufszentren: urbaner Wandel in Berlin*' (Dietrich Reimer Verlag GmbH, Berlin).

Will, J. (2011) '*Shoppingcenter Performance Report Deutschland 2011*' (ecostra Wirtschafts-, Standort- und Strategieberatung in Europa, Wiesbaden).

Falk, B. and Falk M. (ed.) (2015): '*Shopping Center Future*' (Institut für Gewerbezentren, Starnberg).

Gruen, V. and Smith, L. (1960): '*Shopping Towns USA – The planning of Shoppingcenters*' (Reinhold Publishing Corporation, New York).

Gerhard, U. (1998) '*Erlebnis-Shopping oder Versorgungseinkauf? Eine Untersuchung über den Zusammenhang von Freizeit und Einzelhandel am Beispiel der Stadt Edmon-*

[28]MONHEIM 2007: 110; KARUTZ talks in this connection of "sharpening the profile of shopping locations" [KARUTZ 2009: 18f.]

[29]See MONHEIM 2007: 111ff

[30]For more details, see MONHEIM 2007: 110ff

[31]See MONHEIM 2007: 111

ton Kanada' (Selbstverlag der Marburger Geographischen Gesellschaft e.V., Reihe Marburger Geographische Schriften, Teil 133, Marburg/Lahn).
Hahn, B. (2002) '*50 Jahr Shoppingcenter in den USA*' (L.I.S. Verlag, Passau).
Häußermann, H. and Siebel, W. (1987) '*Neue Urbanität*' (Suhrkamp Verlag, Frankfurt am Main).
Hellmann, K.-U. and Zurstiege, G. (ed.) (2008) '*Räume des Konsum*' (VS Verlag für Sozialwissenschaften/GWV Fachverlage GmbH, Wiesbaden).
Jaeck, H.-J. (1998) '*Zur Geschichte des Shoppingcenter*' in: Falk, B. (ed.) (1998) '*Das große Handbuch Shopping-Center*' (verlag moderne industrie, Landsberg/Lech).
Karutz, M. (2009) '*Vom Schreckensszenario zu Lösungsstrategien: Profilierung von Einkaufslagen als Strategie gegen „ausgestorbene" Innenstädte*' in: Muschwitz, Ch. (ed.) '*Stadthandel. Handel in Städten oder Handel mit Städten?*' (unpublished conference transcript 'Stadthandel', Universität Trier, Fachbereich VI Geographie/Geowissenschaften – Raumentwicklung & Landesplanung, Trier).
Kaschuba, W. (2005) '*Urbane Identität: Einheit der Widerprüche?*' in: Wüstenrot Stiftung (ed.) (2005) '*Urbanität und Identität zeitgenössischer europäischer Städte*' (Wüstenrot Stiftung, Ludwigsburg) 8 – 28.
Korzer, T. (2012) '*Lernen von Shoppingcentern. Potenziale für eine ökonomisch tragfähige innerstädtische Einzelhandelsentwicklung für Klein- und Mittelstädten*' (PhD Thesis at the Faculty of Economics, University of Leipzig, published by Books on Demand GmbH, Norderstedt).
Siebel, W. (2006) '*Vorwort zur Veröffentlichung Kontrollierte TRäume. Shopping-Center als neue Form sozialer Kontrolle*' (Wissenschaftlicher Verlag Berlin, Berlin).
Siebel, W. (2007) '*Vom Wandel des öffentlichen Raums' in: Wehrheim, J. (ed.) 'Shoppingmalls. Interdisziplinäre Betrachtungen eines neuen Raumtyps*' (VS Verlag für Sozialwissenschaften/GWV Fachverlage GmbH, Wiesbaden) 77 – 94.
Weidner, S. (2015) '*Wie findet Handel innen statt – Stadtmanagement und Steuerungsbedarf bei Großstrukturen des Einzelhandels*' in: Falk, B. and Falk, M. (ed.) (2015) '*Shopping Center Future*' (Institut für Gewerbezentren, Starnberg).

Imageability, image building forces and phases, and everyday choices of Utopia – the immaterial urban heritage of Rio de Janeiro*

Thereza Christina Couto Carvalho, Alex Assunção Lamounier
Universidade Federal Fluminense, Brasil, Pos-Graduate Program in Architecture and Urbanism
Keywords: organic urban growth, utopia, immaterial urban heritage, Rio de Janeiro

Abstract

This paper addresses utopia as one important attribute in urban configuration. The focus, however, is not planned areas. The philosopher Thérry Paquot (p.91, 1999) defines the principle of utopia as 'circumscribing and modelling a space/place that does not exist, where a community will live according to new rules … it implies a disruption with the surroundings'. This definition would support many of the planned urban transformations that are taking place and fragmenting the city of Rio de Janeiro.

One major attractive attribute of the city is the carioca modus vivendi, i.e. the peculiar way the locals have to relate to each other publicly in public places. In this paper understands this 'carioca way of life' as the everyday 'utopian images of ourselves, and of our lives'. The analyses carried out focus on the role this way of living plays in urban configuration, provided a certain balance, between rules and permissions, is granted to us, the public, in public.

This paper explores the idea that collective happiness is one defining attribute as the everyday utopia in Rio. It discusses the role it plays in enhancing public places in the city and finalizes indicating future perspectives.

*This article reproduces, for the most part, speech given by T. Carvalho on the Polis, the public, the desire and enjoyment: utopia in everyday life, in Symposium held on effects of architecture, held in December 2013, at the UFF. About utopia in everyday life and points to the role that the enjoyment and pleasure, here understood as characteristic of the carioca way of life, engaged in the setting of the city of Rio de Janeiro by integrating its so-called intangible heritage. The Catete fieldwork and methodological application was conducted by doctoral student, A. Lamounier, and was added as a case study.

Introduction: the Utopia in everyday life - the Carioca way of life

The recognition of a city image associated with the enjoyment of public spaces and even artistic inspiration, was one of the propositions of the document approving inclusion of Rio de Janeiro as Cultural landscape on the World Heritage list of humanity. The proposal associates the 'carioca way of life' to the "exceptional urban setting in the city, consisting of essential natural elements that shape and inspire their development". Thus, the world heritage site, approved by the Committee, includes "urban landscapes designed to enhance open air activities and permanence. The proposition takes "principles of identification of cultural landscapes" involving criteria such as "intentionally designed landscape", "scenery" and "evolutionary landscape organically linked to the history and inseparable from the imaginary country for centuries". It stresses, furthermore, that "in Rio e Janeiro, the symbiosis between the city and the landscape is unique, even more striking than the values of the historic site itself, of monuments and architecture" (UNESCO, 7/2/2012). The tipping, in traditional molds, aiming to ' freeze ' a given image in a desired state, can, contrary to popular belief, lead to emptying of the meanings associated with it. Such preservation depends on much more than a continuing maintenance process, which takes into account the understanding of landscape evolution, rather than a normative definition. Discussions about the possibilities of understanding and maintenance of this carioca lifestyle have led to the search for methods of interpretation that illuminate the process. It is a foray into the study of morphology of public spaces under effect of dynamic urban setting processes practiced in everyday life. Therefore, the purpose is not micro morphology, but the middle range morphology, the spatial scale of the public in public, made of individual, cumulative appropriations of public spaces, here understood as walks and sidewalks, plazas and wide, interstitial spaces between buildings and streets. The evolutionary approach adopted is consistent with the Conzenian school, and with the urban configuration processes detected in Rio de Janeiro (Conzen, 1968).

It focuses on how humans relate to space as it addresses the role that the physical environment plays intertwining our lives to places and to place making. The changes that these public spaces have undergone, in some circumstances, have helped to aggregate new uses, and to consolidate them, allowing necessary links between the existing grid with all its multiple functions, shapes and values, and new urban expansions. In other circumstances, other changes have helped to condemn and to lose functional urban tissue and related networks of uses, meanings and values, and social related constructions and expectations (Carvalho and Coelho, 2009).

Methodology: genetic dimensions and process of change of public spaces

"... space as a simultaneity of stories so far." (Doreen Massey, 2009, p. 33)

The Conzenian evolutionary approach adopted supports the 'genetic' metaphor and the methodological assumptions built into the analytical procedure. It emerges from studies, done in Rio de Janeiro, from 1970's to 1990's, of urban re-configuration of large-scale low-income housing projects and of squatter settlements. It later, and gradually, developed into a 'reading method' of the visually perceived interrelationships between public space and the public, applied to pre-existing urban fabrics subject to the impacts of large scale contemporary urban projects for multiple purposes. The method is being tested and, apparently, proving to be useful to answer the question how the two fabrics knit together.

Successive fieldworks carried out during the forty years of my academic career, focused on the visible traces of *individual cumulative space appropriations*. The analytical results showed how the forces of - attraction triggered by some visually perceived singularity, and forces of *aggregation* triggered by envisaged space fruition - are interwoven. In the cases studied, they have built urban fabrics attracting other 'space producers' and enhanced *consolidation and positive identity building stages*. Apparently, the visually perceived spatial or non-spatial attractive singularities, in different dimensions, triggered the improvements identified in the studied urban fabrics. Those forces of configuration, and at-

tributes in various qualitative dimensions, defined forms and functions of street level stores that bordered the squares and streets. Together, at the same time and space, and in sequence, the ripple effects of those perceived singularities showed signs of consolidation with prospects of permanence, and of building identity and appreciation of belonging, as ripple effects. They have also helped defining different levels of centralities and enhanced vitality. Other public agents and the public sector may encourage, permit, condone or reject those ripple effects, according to different prevalent cultural models.

Encouraged or rejected the urban changes and changing forces reaffirm the affinity of the concept of vitality with the public space as sphere of multiple possibilities, of plurality, where distinct trajectories coexist in permanent interrelation.

Therefore, for the purpose of the approach adopted here, the space is not a repository of inherited identities, already incorporated and legitimized by the dominant narrative, it is neither a palimpsest of ordered layers, but it is, rather, the building site of old and new belongings, on the making.

The perception of these multiple perspectives-materialized in distinct spatial practices, in different times, based on different but interrelated dimensions, and scales, favors the recognition of distinct urban configuration processes. To these multiple processes frequently correspond different views about beauty, pleasure and enjoyment that public spaces of various natures, with distinct qualities, under certain conditions, can offer.

From this condition of analysis, emerge other possibilities of decoding public spaces. Reading space appropriations and their representations, the content lived, relational, multiple, heterogeneous, is an interesting experience. The results, to the extent that they can generate evidence of benefits to recognize and accept the "other" on their differences, can reflect positively on the generation of new public policies, not homogenizing, nor reductionist or banal. The liberating purpose justifies the effort.

Analytical categories

This paper addresses public open spaces based on six here called *genetic dimensions* of the urban heritage of a city - the economic, social, morphological, cultural, environmental, political/normative dimensions, and accessibility and mobility as determinant conditions. These dimensions are intertwined in the landscape according to four functional and spatial related patterns of social interaction - attraction, aggregation, consolidation, and "value added tradition" (another VAT). The first pattern relies on one necessary existing singularity - in any of the former six genetic dimensions, which attracts the eye and the mind of the passing observer. The second pattern deals with fruition that aggregates multiple uses and customers. The *consolidation* pattern follows. It derives from multiple invested interests, when and where the previously found uses and customers occurred. Value added tradition, and identity, built in the process, with different meanings added by different "whom's" finalizes the sequence. The sequence follows itself in a cycle. These functional-spatial patterns characterize how each one of the former dimensions relate to each other and what functional spatial links they appear to establish with the adjacent urban area. They have been associated to the process of sedimentation that *knit them together* and that distinguishes them as a genetic code (2009; Carvalho and Coelho, 2010).

Genetic dimensions and dynamic forces and phases of change of public spaces

The morphological dimension addresses physical characteristics of the built environment including sizes, shapes, volumes and types of public spaces and its borders, including buildings alignment, space between buildings, shape and dimensions of public space, squares, streets, sidewalks, and lighting.

The political/normative dimension addresses the characteristics relating to management and property (public, private, semi-public spaces), standards of land use and occupation, and the presence and representations of public sector institutions-schools, hospitals, churches, barracks.

The economic dimension addresses commercial uses, stores small, medium and large companies, for the provision of services and industrial production, in various business scales, as well as financial agencies and ATM.

Figure 1a and 1b. tv set on a trolley car parked on the sidewalk. Time for a smoke enjoying his "siesta" watching tv

The social and cultural dimensions address various forms of space appropriations related to social encounters, fairs, artistic events and collective games. They strengthen attributes and forces of configuration and image-building references associated with cultural identity.

Fruition and pleasure benefit from the attractiveness of these public spaces. Contemplation, tasting, social gatherings and artistic manifestations, allow for experiences and memories that induce belonging and build identity. The content of identity emerges from this configuration process, building places that represent different social groups and, in a continuous process, stimulating more meaningful space appropriations and building place tradition. The ideal of "public art", the street theater of Rio de Janeiro, relates to the utopian image of a "carioca way of life", "so that Rio de Janeiro doesn't become like any other city in Northern Europe, so that Rio de Janeiro is the Rio de Janeiro" (Haddad, 2015 -107). Its intangible heritage is associated with the local way of living.

Singularity's attractiveness add to the vitality of public spaces, induce and enhance emerging centralities, and define the fabric of the city. Once perceived, it triggers social conviviality and visible vitality with multiple meanings: a) accessible to any person; b) houses State institutions; c) enhances enjoyment and social gatherings; d) represents multiple identities (public recognition) and a critical role (public opinion); e) organizes permanence and population flow.

Among essential physical attributes its morphological uniqueness distinguishes its borders in the mesh, thus initial attraction enhances possible aggregations, new uses in multiple dimensions (economic, social, cultural). In these circumstances, squares and streets aggregate visibility, and induce the configuration of different levels of centrality.

Different attributes and qualitative dimensions seem to favor the consolidation of the margins of public spaces. The uniqueness of urban form, perimeter and volume, and plastic beauty, coupled with visibility, certainly attract. However, if public access and space appropriations are not adequately regulated, what were once public assets may be 'privatized' by a few and exclude everybody else. Brasília, DF, illustrates the argument. Intended to mirror a desired future, it defined an admired showcase for a few and pushed off the visible scenery everyone else. Prejudice consolidated social exclusion and opportunism did the rest.

The singularity of the regulatory over-all permission of Taguatinga satellite-city, in opposition to the rigorous standards of occupation of Brasilia, attracted private capital in-

vestments of different scales. Individual cumulative initiatives gradually transformed the original satellite city. Thirty years after its inauguration Taguatinga had become the dynamic economic core of the Federal District, where important businesses converged.

This singularity of regulatory leniency does not relate, therefore, only, to the configuration process of 'spontaneous' settlements. Research conducted in medieval urban fabrics revealed similar performance concerning the forms of occupation, mutual recognition, with greater variation in the rhythms of urban change (2008, 2009).

Organically Evolutionary Landscape in Rio de Janeiro

The configuration processes studied, sometimes called organic, defines ongoing urban transformations of originally planned areas, also of irregular, informal and illegal "spontaneous" settlements together with changes and mutations on pre-existing historic urban fabric. It deals with attributes, dimensions, strength and stages identified in different patterns of space appropriation identified on the margins of open public spaces.

The ongoing research revealed different rhythms of change and signalized three aspects of the configuration process: it is cyclic, simultaneous and with multiple scales and agents. A singular feature triggers an initial attraction, perceived for both enjoyment and pleasure as for complementary commercial purposes. Perceived attraction triggers possible aggregations, in successive stages, of new uses for individual cumulative and successive appropriations, consolidating new urban forms, which in turn attract new users. The collective recognition of perceived belonging underlie public recognition of identity tradition. These forces and phases signalizes a process of dynamic sedimentation, weaving different time and space patterns building new relations.

The convergence of different space, time and building shapes, and of different scales of businesses are important attributes of the morphological richness of Rio de Janeiro. Rua do Catete (Catete Street) and the Largo do Machado Square are good examples where not only the public sector and the organized private sector built the morphology of the area but, also, individual cumulative initiatives that triggered important collective repercussions.

The chosen road structured the configuration of the old town, connecting strategic places. It received several denominations, according to different prevalent genetic singularity in each period of time. The first genetic dimension to show was the political/normative one. It was the King's Road, between 1808 and 1812, during the napoleon war, when the King of Portugal fled Europe and ruled his kingdom from Brazil. It guaranteed the strategic connection between the colonial Government Palace, in the urban core of the Rio de Janeiro, to the hill of the Church of Our Lady of the Glory and to agricultural supply[1]. The frequent King's parade along its course increased visibility, strengthened its political singularity and intensified the traffic, attracting successive individual cumulative appropriations of plots along its course, for both commercial and residential use. At the same time, the Government on one end and the Church on the other, induced unique social and cultural gatherings. Singularity attracts singularities and, together, they strengthened the structuring role of the road as one major linear centrality in town.

The initial political and cultural uniqueness, together with the consequent social and economic growing importance, structured the route for the urban expansion that followed. In this role, the road changed names revealing its successive new destinies - Road to Red Beach, Road to Botafogo Beach, Catete (river) Road. Public authorities refined building standards and alignment, built drainage and water provision networks, channeled rivers, and propitiated the consolidation of this road as a valued route, and, in sequence, reinforced its role as attractive place for more economic, social and cultural uses. The first level floors of the buildings situated along the road have, since then (1808), attracted trades and services, of different natures, with different levels of organization and concentration of capital and information defining significant hierarchy of centrality in polycentric Rio.

[1]Cruls, asserts that "the path that led to the southern part of the city [...] must have been the oldest, since it needed, when you made the switch from the city of Vila Velha to the Morro do Castelo ".

It attracted the interest of different social groups such as higher income families that chose to distance themselves from congested urban center. The neighborhoods of Lapa, Glória, Flamengo and Botafogo, all gravitating around Catete Road and main square, were thus configured (Abreu, 1987, p. 37) undergoing remarkable growth between 1821 and 1838. The original large plots of those neighborhoods served agricultural purposes. Those neighborhoods, described in short stories, chronicles and romances written at the end of the 19th century, became cultural references and enhanced attractiveness, value and perceived identity of the area.

As a result of forces and phases of dynamic sedimentation (Carvalho and Coelho, 2009), the consolidation of these early occupations materialized in refined urban forms, in different time periods, resulting in prestige and reinforced identity for both the Catete Street and the main square.

Several individual cumulative appropriations of blocks and lots to its margin added meanings and value to Largo do Machado and Catete Street, still in the 19th century. They reflect its recognition, by the user population and resident, as singular attractive space, demanding equal investments from the public sector. In 1841, this Largo was to be lit for the celebration of the coronation of Dom Pedro II. The street lights enhanced the attributes of the place, aggregated new patterns of space and functional appropriations, and attracted even more passers-by to the pleasure of contemplation and enjoyment, uses that added meaning and led to a sense of belonging and identity with the area. It also reinforced its centrality. New investments improved access and mobility and triggered positive ripple effects. The first public transportation streetcar line in the city ran along Catete Street and stopped by the Largo. The Botanical Garden Railroad Company, in 1868, started this line from the city centre to the area in question, through Catete Street. The line expanded, in 1871, to the Botanical Garden and Gávea. In 1892, electric street cars took over and in 1976 the first metro line was built along the same route. The recurrence of investments reinforces the economic, social, cultural and political prestige acquired. Other initiatives followed to enhance Largo do Machado[2].

From those original landscape projects the huge fig trees and the very tall palm trees remained. They still distinguish the Largo do Machado amid the density of the surrounding buildings and reaffirm the prestige of both the Catete Street and the Largo. The presence of refined architecture buildings, home to renowned institutions still today, as in the period of the second empire also serve the same purpose. Among these are the Portuguese Hospital, the Positivist Temple, the Bishop's Palace of São Joaquim, the Faculty of Medicine, and the School Amaro Cavalcante, (Lustosa, 1999, p.3). Most important of all, on Catete Street, the original Presidential Palace of Brazil, turned into a museum since the Federal District function was transferred to Brasilia, in 1961.

Indicative of the public recognition of the social and cultural genetic attractiveness of the area, the short story "Battle at the Largo do Machado", by famous Brazilian writer Rubem Braga (1935), described "a deep samba *orfeônico* to the large masses", in which "everyone advances beating drums". Circling around the square, going down the Street of Catete, Largo do Machado carnival "blocos" still bring together thousands of cariocas and tourists. Another sign of the vitality of the place is the 'moving' street theater. Following the initiative of Professor Turle Licko on "theatre of the oppressed", at UNIRIO-Urca, a group of theater students and people interested in the subject proposed to hold meetings in public spaces from Rio de Janeiro to discuss Street Theater, appropriation of public space and privatization.

This consists of a sort of 'coffee in the square', a participatory spectacle, constructing a scene, with a screenplay and viewer, which can intervene and participate directly in the debate. Asked about the choice of Largo do Machado to stage the first encounter, Turle explained that "the Largo do Machado is a place where everything happens". The answer confirms the underlying hypothesis of the method adopted of the cyclic behavior of the "organic or spontaneous" configuration process here analyzed.

[2]In 1869, the square was redesigned with an elaborate landscaping project by renowned French Landscaper, Glaziou.

Figure 2. The "theatre of the oppressed" in the square, appropriation-spectacle that encourages interaction with the public and with the public space. Photo: Lamounier, 09/2013

The Palace gardens and the Largo, together with the greens of the housing condominium Guinle Park, the Park of Flamengo, and two smaller squares, Saint Salvador square and the Jose de Alencar square, define an important network of open public spaces that distinguishes the neighborhood. Jose de Alencar Square and the highways that cut across Park of Flamengo perform different important complementary functions related to both traffic and mobility while Parque Guinle and Saint Salvador Square perform the transitional role of reducing the morphological scale closer to social and cultural practices of smaller communities.

Conclusion: Preliminary findings of a survey in progress

Some preliminary results emerge from this study of image building forces and phases, and everyday choices of Utopia. The perceived individual spatial cumulative appropriations of public spaces revealed various imaginary projections and desires. These seem to reflect the "carioca utopia" in everyday life as a criterion of choice and space appropriation of the city of Rio de Janeiro. Fruition, stimulated by attractive singularities, helps enormously to build meaningful places, leading to its preservation as tradition. Recognition as tradition in turn also constitutes a singularity attractive to more uses and fruition.

The continued fruition appears to generate everyday appropriations that establish a sense of affection. These appropriations are, thus, in forms of territorialization that although appear single, do not cease to be shared. The identification with the city's public spaces is therefore the identification of values on the other. The enjoyment of public space is also the enjoyment of the audience that frequents it. The identification with public spaces recognized as representative of a traditional city, passes through the recognition of the other and is also a form of identification with the city itself.

Successive actions of public authorities reaffirmed the Catete Street and Largo do Machado as major centralities of Rio de Janeiro. Access to public transportation, artistic presentations, contemplation of the landscape and of the others, the chosen route to go to work, all together enhanced attractiveness and guarantee the neighborhood participation in the everyday life of the city and its citizens. Various stages of collective

enjoyment defined new space and functional patterns, set new standards of attractions, of aggregation, of consolidation and added or strengthened everyday perceived sense of belonging building place identity.

The sense of appreciation and belonging renews meanings and identities, and ensures, in a cyclical process, more attractiveness. Its consolidation relates to a sense of recognition, familiarity, which depends on this everyday construction. The continued experience is more propitious to the establishment of links with a particular space that is associated with a desired image. The analysis of spatial appropriations of the studied area reveals the cyclical character of the sedimentation phases, as defined by the methodological procedure here adopted. The method also proved useful to acknowledge the "carioca way of life tradition" that Largo do Machado and Catete Street helped to build.

References

Conzen, M. R. G. (1968) 'The use of town plans in the study of urban history', in Dyos, H. J. (ed.) *The study of urban history* (Edward Arnold, London) 113-30.

Carvalho (Santos), T.C. e Coelho, C.D. (2009) *O capital genético das redes de espaços públicos*, in Ordem, Desordem e Ordenamento, Luiz Manoel Gazzaneo e Ana Albano Amora (org.). Rio de Janeiro: UFRJ/FAU/PROARQ, 284-303.

Carvalho, T.C. (1993) The Space of Citizenship: visually perceived non-spatial dimensions of housing. In: ARIAS, E. G. (org.). The meaning and use of housing. Brookfield-USA: Avebury, v. 7, p. 265-287 - (1985) As Dimensões da Habitação. Projeto (São Paulo), v. 77. São Paulo, Projeto,. p. 95-103.

Cruls, G. Aparência do Rio de Janeiro – notícia histórica e descritiva da cidade. Coleção Rio 4 Séculos, Vol. 1 (3ª ed.). Rio de Janeiro: José Olympio ed., 1965

Massey, D. (2009) On Space. Rio de Janeiro: Bertrand Brasil.

Paquot, T. (2006) Terre Urbaine, cinq défis pour le devenir de la planète. Paris: Éditions La Découverte.

PM RIO – Prefeitura Municipal do Rio de Janeiro. Área de Proteção do Ambiente Cultural – APAC – Catete. Rio de Janeiro: PM RIO, [2005]. Disponível em: <http://www0.rio.rj.gov.br/patrimonio/apac/anexos/catete_textos.pdf>. Acesso em maio de 2015.

UNESCO – ORGANIZAÇÃO DAS NAÇÕES UNIDAS PARA A EDUCAÇÃO, A CIÊNCIA E A CULTURA. Com o Rio, Brasil passa a ter 19 sítios na Lista do Patrimônio Mundial da UNESCO. Representação da UNESCO no Brasil. Brasília: 02 de julho de 2012. Disponível em <http://www.unesco.org/new/pt/brasilia/about-this-office/single-view/news/rio_becomes_the_19th_brazilian_site_in_the_world_heritage_list_of_unesco/>. Acesso em 15/09/2012.

Imagining New Forms. Public Space and Design Practice

Michele Beccu
Dipartimento di Architettura, Università degli Studi Roma Tre, Italy
Keywords: Public space, Urban design, Architectural form

Abstract

The very nature of creating public space is undergoing profound changes. In the contemporary city public space no longer possesses the figurative strength of classical typologies: the piazza, the forum, the boulevard. It assumes new and unprecedented forms, dictated by heterogeneous urban and building programmes that pursue other objectives. Public spaces must now be sought in "other" programmes. Programmes for the urban regeneration of peripheral or semi-central portions of the city, integrated transport plans, interconnections and exchanges between forms of mobility, operations to valorise or recover abandoned lands. This profound transformation "at the roots" has generated new morphologies of public space. The character of these spaces is less determined in its expression, less coherent. They appear more elementary, filament-like, inexorably conditioned by functions of connecting, linking, of "finding space". A new challenge is presented to theoretical and design research: the search for new forms, new figurative structures that resolve not only the functions and needs underlying a project, but which constitute a balanced paradigm capable of integrating the multiple components of which it is comprised: contextual conditions, environmental compatibility, conflicts between resources and restrictions, a relationship with Tradition. The search for a "New Form" often comports a profound alteration of positions, of topographic structures, a more complex listening to context. Excavation, moving downward, or the construction of an acropolis, operations of "subtraction" or "addition", appear to constitute a suitable response, even symbolic, to the definition of a new "Italian" space.

Extended Introduction

Public space is in the throes of a profound mutation. Its forms no longer possess the figurative robustness and content of consolidated typologies: the public square, the public building, the tree-lined boulevard. In the contemporary city the richness of meaning once intimately and inherently part of the historic city and the very notion of 'built form' appear definitively lost. The definition of public space offered by Maurice Cerasi some forty years ago of 'a unitary system of spaces and buildings absorbed by the urbanised territory and partaking in everyday life, shared by large groups of the population and constituting the spaces and seats of their collective experiences', in other words, the organic and coherent concatenation of shared spaces typical of our cities, appears condemned to extinction. In the meantime, public intervention in built space expands its competence and pervasiveness, and 'appears fragmented into disconnected operations, (roads, monuments, public buildings, subterranean infrastructures…)'. (Cerasi, 1976)

This 'disconnection' forces public space to assume new and unprecedented forms dictated by heterogeneous urban programs and projects conceived with other objectives in mind. They no longer focus on the idea of urban form or on the true sense of collective space, but on regenerating the peripheral or semi-central areas of the city, the interconnection and exchange between different forms of movement, the recovery and promotion of abandoned areas. The result is an articulated variety of public spaces whose morphology is not always ordered or intelligible. This profound transformation 'at the roots' has deeply affected the very characteristics of urban form. Indeed, urban spaces appear more elementary, filament-like, inexorably conditioned by the functions of connecting and linking, and thus elongated and without a fixed centre. These often incoherent linear sequences, un-dissolved in the fluidity of space, knotted and intertwined like the forms and spaces of mobility, are loaded with urban values and new 'rights of way' adapted to new roles in the city. There is an entirely particular phenomenology of connection, incapable of prefiguring spaces suitable to pauses and human relations, of constructing a scenario of collective life in the city: 'In the past the Italian piazza was in the end a theatre: a playhouse for the urban activities of citizens'. (Quaroni, 1985)

Urban form and public space have become antagonists. In the midst of this opposition architecture is asked to integrate multiple and contradictory elements. To achieve this it must travel along a trajectory of overlapping strategies linked to context, technique and procedures, considering a host of specialisations whose extensive network of restrictions undermines the very foundations of architectural autonomy as an act of expression, as a technical-poetic artefact. Practice is thus measured against the search for an 'exact' solution to an equation with too many variables, in difficulty when dealing with the real process of comprehending and harmonising the many aspects of context, typology, technology and form necessary to achieve an equilibrium. An equilibrium of form that often requires that the architect-author take a step back, or to the side, to truly be effective and resolve the issues at hand.

Contemporary architecture must renounce its ideological charge as the universal solution to all problems; it must prepare itself to offer a cautious gift for meditation, presenting itself increasingly more in its 'grammatological version' that foresees 'the deconstruction of its logo-centric structure and its rigorously finalised and teleological temporality'. Forty years on Massimo Cacciari's 'decalogue' appears to fully confirm its effective interpretation of the Aporia of Architecture in the modern era, when 'we could, through a number of finite steps, answer any question, saturate any demand that could be expressed in the language considered'. (Cacciari, 1984) This less assertive and omnipotent 'version' of 'Architecture' seems as applicable as ever. Architectural form faces many perils. It risks becoming something secondary, negligible; yet, it is simultaneously entrusted with the role of identifying a delicate – though not fragile – equilibrium within that process, with saturating those demands.

Without a doubt this is a torturous process, made also of renunciations. In a recent essay commenting on the results of the redesign of the 'Giustiniano Imperatore' district in Rome, Giovanni Leoni stated: 'This step back by the architect-author is certainly the fruit of a realistic understanding (...) perhaps obliged by real the economic conditions and real processes of

making architecture, though it becomes interesting when it transforms the lamentations over the marginality of the architect into the theme of a project: what role is assumed by individual architectural invention (...) in a project dominated by the complexity of restrictions? The entire project for Giustiniano Imperatore is an exercise in dealing with restrictions (...) more exactly in controlling form as the synthetic and visible result of a complex process'. (Leoni, 2012)

Controlling form was problematic from the outset given the characteristics of the initial program: attributing a unitary form and architectural identity to elements that suffered *ab origine* from the condition of the fragment. This control was achieved by employing a device based on measured approaches to the design of architecture, even at the smallest of scales, and by stubbornly pursuing relations with context. The adoption of a unique material for the exterior finishes, the establishment of an ordered succession of building volumes, the alignment of the travertine-clad podiums, the ordering of a dense network of pedestrian paths crossing the neighbourhood, the references to twentieth century Roman construction. The attempt to introduce order also marked an opening toward a new opportunity for figurative expression. Metropolitan spaces require identity and recognisability, the design of new spatial arrangements and renewed urban functions, exploiting the frequent opportunities to rehabilitate the city without simply being 'conservative'. Urban renewal and technological modernisation cannot be tautological and self-referential undertakings. We must pay greater attention to 'how' we do this and to restoring its meaning. This is possible when we privilege the small scale and a certain identity of place by establishing networks for the shared use of public spaces, adopting eloquent materials and the typologies of landscaping. Proceeding 'through discrete objects, though minimal shifts', without the pretence of 'making each gesture a model'. (Gregotti, 1984).

Urban Form and Mobility

The modern railway station is one urban device whose characteristics have undergone the most significant modifications in the wake of transformations to mobility. It has gradually shed its 'heroic' late-nineteenth century qualities as the principal mechanism of the spread of modernisation, to become a sort of trans-typology, an adaptive and complex organism capable of attracting and channelling the flows generated by diverse forms of mobility and injecting them within a multiplicity of interconnected activities. The 'steel scenario' that introduced the right to travel and the myth of speed disappears; travel and movement are only two of many activities. The railway station is now also a functional and symbolic representation of commerce, entertainment, hospitality and moments of pause. The very spaces of these facilities change, moving farther away from the nineteenth century terminal gallerias in steel and glass, with the consequent disappearance of the 'landscape of trains' that once constituted the inexorably dark and dusty backdrop to the railway station. This is evident in the Tiburtina Railway Station, 'grafted onto a past decision to construct a 'bridge' station taken by the State Railway', (Biraghi; Micheli, 2013) a rigid restriction to be harmoniously incorporated in the new project, but also an occasion to create a grand pedestrian galleria suspended above the swathe of rail lines, similar to a covered monumental 'urban boulevard' linked at its two extremities by two large 'urban atriums' facing two very different environments.

Two inviting and cavernous atriums hosting flows to and from two different parts of the city, rationalising profoundly intertwined urban functions and systems of transport: trains, subways, buses, cars and pedestrians. However, the greatest modification occurs in the large container above where suspended volumes float in a powerfully oriented though non-linear space; a dilated and flexible space of intertwining and overlapping events, where the descent toward track level occurs in an archipelago of different activities. The New Station is a 'stratification' of functions and typologies; it represents a new phase in the revision of the traditional typologies of Modernism.

The Tiburtina Station creates a shift in the landscape of reference: the 'face of the railway' gives way to the scenario of the city, which invades the station through the its immense glass walls. Other recent projects demonstrate equally interesting aspects in the evolution of this space-station. The recent Casa Port in the harbour of Casablanca, Morocco by Arep-

France and Groupe 3 (F.M.G., 2014), demonstrates very interesting aspects of a renewal that is underway. The station is a vast, 2,500 m2 quadrangular hall, a full-height space with ample areas visually and functionally linked with the ground floor and expanding the commercial spaces and services densely crowding the perimeter of the station. The ground floor is adjacent to a public parking area with two additional levels below grade. The hall is a vast public square whose expansive and transparent spaces recall the hypostyle constructions of the East; blinding sunlight is attenuated by a skin of musharabiya. Tall steel columns branch off into tree-like capitals that open to the passage of overhead light. The multi-storeyed interior space is continually interrupted by activities, commercial desks, seating and waiting areas. What is surprising here is the total lack of any reference – even symbolic – to its primary function as a space of transportation. There is no emphasis on the passages to the railway 'quais' alongside the structure, but only discrete exits to the platforms between commercial activities, situated along one side of the great hall. It is a complex but relaxed space, immersed in the flows of placid everyday life. A space characterised by a strong sense of urbanity, marked by the elegant grafting of the station and the offices of the Oncf that tie the entire project back to the city. To a greater or lesser degree, the contemporary railway station is proposed as a highly innovative typology, able to adapt to the evolution of forms of transportation and the shifting demands of urban mobility.

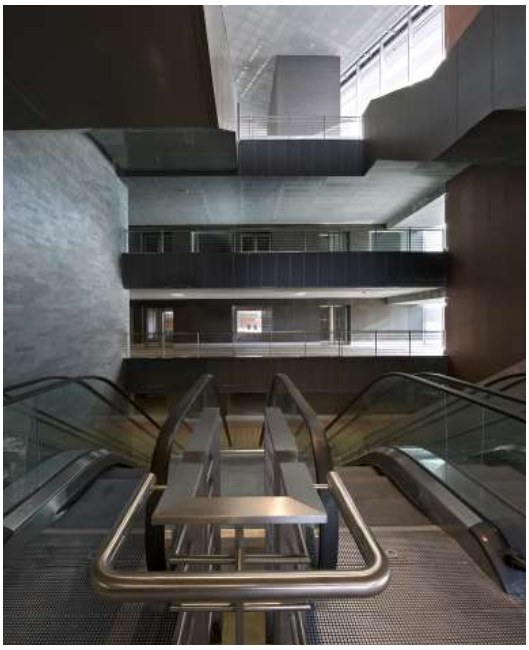
The interchange between diverse forms of mobility is also generating a new typology of spaces of interaction: sunken or carved-out spaces, longitudinal spaces, legible only in elongated sections. Their conformation is a direct descendant of the function they perform: favouring movement from one place to another, from one level to another. They are spaces of connection and relation, not explicitly conceived for socialisation, but which become spaces of encounter and relations. Confined to the recesses of hypogeal connections they are drawn out. The idea of the section dominates and the act of connecting various levels is frequently represented in sections and flow diagrams. The consideration of these spaces comports a consideration of the specificity of a new architectural form.

A benchmark project is the Souterrain Tram Tunnel in The Hague, a pedestrian underpass designed by Rem Koolhaas-OMA between 1994 and 2004. (OMA Rem Koolhaas, 2007). As the architect himself tells us, it is as much a piece of infrastructure as a buried building. A sort of immense, 1,250 meter long subterranean 'shovel', with two subway stations at its ends and connections to a parking structure above articulated on multiple levels. The project functions as a sort of infrastructural spine that structures a portion of the city from below its surface, freeing up pedestrian space for activities above. The stratification between parking and the subway optimises the relationship between these two functions. Rather than representing a limit, here the linearity of space becomes an added resource, creating fluid relations between parking, tram, ramps, mechanised connections. Parking is not trapped between walls, but visible from below through large glazed surfaces. The tunnel is wrapped by a wall that folds to become a slab, floor plate and beam. This continual surface is intimately linked to the typology that defines the infrastructural nature of the project. The raw finish to the walls is exalted by the treatment of natural and artificial light. Wood floors accentuate the almost 'domestic' qualities of this elongated space that folds, curves and flexes in long ramps that exploit the linear form of the tunnel. The cross section reveals unprecedented possibilities to create visual relations with the sides and the ends, changing form, rising up or crashing down, physically or visually connecting with all possible spaces of interaction and relation.

This project interrupts the uncontested dominion of 'engineering' over such spaces. Space is conceived as a theme of architecture. It indicates a clear direction: unhinging the invasive 'objectuality' of structures of mobility, often expressed in the forms of technological and material exhibitionism, to identify a new 'meaning' for the act of descending, of giving form to the space of connection, to networks of mobility running below the surface.

It is this principle of subtraction that inspires the projects for the B1 Line of the Roman subway. They begin with the idea of 'disassembling' the hypertrophic forms of previous projects, in order to arrive at the thematization of excavation and the 'subtraction' of form through the 'dissolution' of the highly specialised perimeter of the building-station, proposing environments more akin to their surroundings, and a renewed compatibility between urban and infrastructural space, offering occasions for redesigning the spaces of the city.

Figure 1. 211-1276-1-SP_ABDR Architetti Associati. Stazione Alta Velocità Roma Tiburtina. 2002-2011. Vista interna atrio Nomentano



The Libia and Annibaliano stations were designed to respect this principle. This result was obtained by creating sunken plazas, hypogeal urban spaces that 'draw' the city toward the atriums and services offered by the station. Eliminating the volumes projecting above the surface simplifies the devices of descent and access to the atriums. This sunken spaces allows commuters to complete the final phase of approach before descending into an open space, whose quality is enhanced by small services that help minimise the sense of discomfort that accompanies a descent below grade.

The Libia station is characterised by a sunken quadrangular plaza that captures commuter flows and directs them toward the atrium. The plaza exposes the section of the project, all the way down to track level, through the depth of the irregular light well that expands as a fractured line as it plunges below grade. The process is analogous to the ancient wells that channelled light into the catacombs. Occupied by mechanized systems of vertical circulation, the well brings natural light down to track level. This monumental void emerges into Piazza Palombara Sabina in the form of a skylight composed of large coloured glass panes. The Annibaliano station instead assumes the appearance of the sinuous curvilinear forms of a hypogeal plaza. A vast space open to the sky that constitutes a centrality and new landmark for the neighbourhood, a large sunken ovoid plaza reached by gradually descending from the urban axes flanking it. This space gives on to the atrium of the station, drastically reducing any volumetric confrontation with the adjacent monumental complexes of Santa Agnese, the Mausoleum of S. Costanza and the apse of the Constantinian basilica. The descent to the lower level occurs via a stair that interrupts the perimeter wall, reminiscent of an ancient system found for example in the sunken '*piazzuola*' of the Catacombs of St. Sebastian, later buried. The plaza is 8.50 meters below street level and characterised by a curvilinear perimeter, interrupted by an intermediate level of circulation and an overlook to the spaces below. The curving walls are clad in non-planar concrete 'plates' that define a sort of monumental pattern of *opus incertum*, gently stepping toward the upper level in a formal allusion to the nearby Constantinian structure. 'In a unique moment we find the interior and exterior qualities of all Roman space, the hypogeal – the circular form refers also to the spaces of access to some of Rome's catacombs – and the autonomous object in the landscape'. (Montuori, 2014)

This space also reproduces the relationship with the urban context, where the duality

Figure 2. 211-1279-1-SP_ ABDR Architetti Associati. Teatro dell' Opera di Firenze. 2007-2011. Vista del sistema di risalita verso la Torre Scenica
Figure 3. 211-1282-1-SP_ ABDR Architetti Associati. Stazione della Metropolitana B1 "Annibaliano" a Roma. 2004-2012. Vista della piazza ipogea (con Maire Tecnimont spa)

of concave-convex exists in the relationship between the material pattern of the curving wall and the rounded façades and balconies of the blocks framing the plaza, and with the nearby monuments.

Public Building and Urban Landscape

The construction of an urban landscape in Italy often refers to the concept of distance, which implies an exalted perception of architecture. Our cities are often perched on a high site, in an exclusive position, creating the conditions for a privileged observation of its urban surroundings. At the same time, these assemblages of architecture are also perceived from a distance, acquiring new meaning in the process. One acute interpreter of this sentiment of architecture as 'exalted' composition was K.F. Schinkel. In the famous drawings from his travels of 1804, the great Prussian architect penetrated into the depths of the very essence of the Italian landscape; however, his aesthetic celebration of the landscape values of Italy's territories and cities were also a formulation of a theoretical proposition, a program for architecture. Schinkel was interested in the relationship between nature and the process of incessant transformation operated by human hands. He interpreted it as a 'second nature' that models the landscape in accordance with the aesthetic intentions and building practices of the architect. The relationship between building and landscape is centred on 'prolonging' nature through human intervention represented by the forms of construction, which assume highly precise characteristics. In his celebrated vistas and view of the Campidoglio in Rome, Schinkel delineated an equal number of architectural compositions, each of which interprets precise relations between nature, built architecture and the rapport with the landscape. The famous *City square by the sea* depicts an ideal public square excavated below the line of the horizon, enriched by Roman and Venetian motifs, while the *Design for a Theatre Set, A Cathedral on an Eminence above a Large Town by the Sea* and the more cryptic *Group of temples that from below reach toward the horizon*, define a sequence of themes ordered by elements of architecture of increasing complexity: a natural bastion that transforms into a built fortification, from an excavated base to a terraced podium overlooking the sea and served by a scenographic system of ramps. It is a system of architecture of differing complexities, visually coordinated and constantly bound to the viewpoint of the spectator and the horizon: 'The elevated point of view presents a horizon divided into two halves at the midpoint of the perspective, defining the excavated space of imagined voids and the masses of constructions that surpass the ideal height from which they are viewed'. (Di Domenico, 2012)

Theoretical intentions and practical indications are mixed: excavations, platforms, physical devices and operative methods bring the viewer closer or move him/her farther away, in accordance with the necessities and specific characteristics of the architecture proposed, suggest a complex consideration of architectural composition and urban form. Constructing a podium is thus an act of bestowing meaning, of rendering a site significant by introducing an architectural element, entrusting architecture to a 'distant' view that emphasises its role. This is how Schinkel re-read Italy's historic architecture, which exalts the sense of the path, and where the act of ascending becomes a ritualised device for perceiving monuments dense with meaning.

This theme of the relation between a public building and the ground on which it stands, in the case of a highly specialized building and a large block of offices was approached in two different cases corresponding with two different typologies of podium. One proposes a vast sloping system of ramps and public squares, the other resembles a flat mesa, hollowed out and accessed by a monumental stair. The New Opera Theatre in Florence (Mondaini; Potenza, 2014) is a large project that reconnects the city with the Parco delle Cascine. It is a collection of ramps and plazas that extend public space. Inside are a range of new auditorium facilities and services. The complex proposes a sort of typological 'montage' of stereometric blocks: the music halls, the foyer-circulation space linking them, the fly tower and the offices are linked by an Acropolis-like system of plazas, ramps and public spaces that recalls the terraces of Florence. The new volumes, the *cavea* at their summit, the hanging gardens all conspire to create a true mineral park, a privileged space for the observation of the city's monumental skyline. The project is intended as a continuation of the system of *poggi*, terraces and belvederes that constitute the traditional devices for observing the city, 'the construction of the landscape'. A new ideal phase in the monumental landscape program conceived by Giuseppe Poggi for post-unification Florence, which restored the visible side of the modern city. (Agostini, 2002) Designing a new institutional structure in the city of Rome signifies confronting the legacy of its monumental heritage. In the case of the New Campidoglio II (Unified City Hall), this task is particularly complicated because it signifies defining the identity and representative qualities of important public buildings, consistently aware of an unavoidable analogous reference: the architecture of the EUR and the Campidoglio itself. Approaching such a difficult and complex theme, such as an institutional building, means seeking a response also in the representative qualities of form, following a principle. It means imagining a *locus*, an elevated site, an architectural platform served by a path, a monumental stair that confers a solemn identity on the site. Without renouncing a modern interpretation of its physical and technological components.

A Few Conclusions

A new task stands before theoretical and design research. The search for new forms, new architectural and figurative arrangements that refer not only to the overlap of functions and requirements at the base of any project, but which constitute a 'balanced paradigm', capable of holding together a renewed attention toward context, an approach to environmental compatibility that is not only the result of the 'dictatorship of green', the composition of the divergence between resources and restrictions, a relationship with Tradition unfettered by nostalgia. This research comports that we listen very careful to context, as the Italian territory is a layered text rich with symbolic and physical presences impossible to ignore, and a renewed and founding relationship between urban morphology and typologies of built spaces. Possible fields of operation include: 1. A return to the themes of Italian tradition, to its historic forms of settlement, may constitute an inclusive reference and source of identity. A relationship with positions and contexts, the articulation of the ground plane, the themes of void space, the hypogeal, vertical movement, the bastion, the terrace, each represents a historicized operation, though rich with expressive values and figurative density. Practices of 'subtraction' or 'addition' may constitute a new symbolic and operative response, even if partial, to the redefinition of 'Italian' space. 2. The natural parterre and its artificial treatment, both considered as new building materials, ini-

Figure 4. 211-1283-1-SP_ ABDR Architetti Associati_Nuovo Complesso di Uffici "Campidoglio II" a Roma. 2012. Vista della piazza sopraelevata e dei blocchi direzionali

tially partake in the aesthetic definition of open space. The continuity of materials and uses of horizontal and vertical surfaces, so common to the Italian city, affirm a new leading role for materials. 3. The singularity of the 'topographic' condition, the richness of the geo-morphological support and the attention to 'position' are a resource and source of identity for our territories. These aspects powerfully re-propose the need to lay down roots, to employ orography data not only in a correct, but also a 'reasoned' manner. 4. The importance of the expressive role of materials and the possibility to define them in versions specially tested to match the specificity of each project. Increasing the integration with the process of manufacturing building and industrial materials in order to experiment with new possibilities for expression and favour an intelligent transfer of technology. 5. The management of the complexity of the contributions made by specialists, which reduces conflict and promotes integration. A new horizon founded on a new relationship between the precision of technological form and the expressive qualities of architectural form.

References

Cerasi, M. (1976) *Lo spazio collettivo della città* (Gabriele Mazzotta Editore, Milano) 75-77.
Quaroni, L. (1985) 'Un avvenire per la piazza?', *50, rue de Varenne, La piazza e la città* (Arnoldo Mondadori editore, Milano) 112-116.
Cacciari, M. (1984) 'Un Ordine che esclude la Legge', *Casabella*, 498/9, Gennaio-Febbraio, 14-15.
Leoni, G. (2012) 'Vitalità dell'opera Vs autorialità', in Costi D. (ed.) *Critica e Progetto. Architettura italiana contemporanea* (Franco Angeli, Milano), 64
Gregotti, V. (1984) 'Modificazione', *Casabella*, 498/9, Gennaio-Febbraio, 2-7.
Biraghi, M.; Micheli, S. (2013) *Storia dell'architettura italiana 1985-2015* (Giulio Einaudi Editore, Milano)
F.M.G. (2014), 'La Gare de Casa Port. Vers une mobilitè multimodale', *Architecture du Maroc*, 62, octobre-novembre 2014, 32-41
OMA Rem Koolhaas, (2007) 'Souterrain, The Hague, two tram stations and a car park', *El Croquis,* 134-135. I-II, 44-61.
Montuori, L. (2014) 'ABDR Architetti Associati, la stazione Annibaliano della linea B1 della Metropolitana di Roma', *L'Industria delle Costruzioni*, 436, marzo-aprile, 56-65
Di Domenico, C. (2012) *Il punto di vista immaginario* (Il Melangolo, Genova), 54-56
Mondaini, G.; Potenza, D. (2014) *ABDR Architetti Associati* (EDILStampa, Roma)
Agostini, E.M. (2002) 'La costruzione del paesaggio, Giuseppe Poggi a Firenze', *Firenze Architettura,* Anno VI, 1&2, 90-99

The Morphology of Urban Corridors in Mexico City

Milton Montejano Castillo
School of Architecture and Engineering, Instituto Politécnico Nacional, Mexico (ESIA-TEC IPN)
Keywords: Urban corridors, Typology, Morphology, Mexico City

Abstract

In Mexico City, the term urban corridor refers to the concentrations of commercial and services activities developed historically and spontaneously in a linear form. Consequently, urban planning has been considering them as a component of the urban structure and as such, urban corridors must develop under certain zoning codes and urban development guidelines (i.e. investment and densification). However, in spite of the importance of urban corridors, until now, no detailed classification or differentiation exist between corridors concerning their nature, morphology or land use specialization, something that would support and would make more precise urban development goals. Therefore, in this paper we use a statistical method to identify significant variables to formulate a typology of urban corridors in Mexico City taking the official cadastral corridors database as analysis unit. In spite of the heterogeneity and mixture of land uses observed in the field, morphological variables remained as the significant ones and thirteen types of urban corridors were identified out of 106 corridors. Based on empirical evidences, we may say that phenomenon of urban corridors is much more complex than the normative definitions around them, but urban morphology techniques and concepts may be very useful to understand the phenomenon from a more comprehensive view.

Introduction

The spontaneous appearance of commercial activities and services along intense traffic roads has historically accompanied the formation and growth of many cities. Within this process, the location of these concentrations has moved away from the urban center, to be developed along other communication lines in which the forces of the market and the new local accessibility points have permitted it. These concentrations, called *corridors*, are thus another one of the elements of the city´s internal geography.

To comprehend the specifics of corridors, it is necessary to investigate the evolution of their use, their use intensity, their geographic specifications, their housing market characteristics, their sociodemographic composition, and maybe more subjective aspects that have to do with the urban image or the use of spaces which may promote social cohesion. However, there are just a few studies on this regard, and the majority focus on the identification of corridors with planning goals, which consider the corridors as the support and connection between urban centers and sub centers. Urban studies that address this subject from a non-regulatory perspective are very scarce. Under this assumption, and considering the scarce information regarding the subject for Mexican cities, the concern arises to enquire: what is the nature of the corridors in Mexico City? Which are the most relevant variables in the conformation of the corridors in the city of Mexico? According to what variables can these corridors be classified? Is there a difference of functions? Is there any territorial pattern according to the type of corridors?

With an exploratory nature, this investigation presents the construction of a typology of corridors based on analysis techniques that allow us to know if some of the variables of the physical structure of the urban territory can make a difference between corridor families, and under this criteria, which corridors can be associated with each other.

Corridors: definitions and classifications

In an extensive sense, the term corridor can be interpreted in three different ways (Priemus and Zonneveld, 2003: 173): a) the corridor as an axis of infrastructure, -defined in terms of traffic engineering; b) the corridor as an axis of economic development, in which it is assumed that results from the economic activities will be determined by the infrastructure network; and c) the corridor as an axis of urbanization, in which the infrastructure network serves as the basis for directing future urbanization. In spite of the similarities and overlaps that the three interpretations may share, works that have attempted to integrate them have been truly scarce.

Within the first theories regarding the information and transformation of corridors, we find the proposal of geographer J. C. Whebell in his article "Corridors: a Theory of Urban Systems" (Whebell, 1969: 34-56). In this article, the takes the case of South Ontario and the Canadian geographer proposes the term corridor to refer to a linear array of cities united by the weaving of highly developed transportation routes.

Whebell not only referred to a static urban agglomeration, but to a dynamic structure that could be modeled within a series of development stages which would be influenced by three premises: a) the geographic land differences regarding their fertility and resources; b) the manner in which technology and other innovations are dispersed throughout a territory from a hierarchy of places and c), that human decisions would follow the principle of minimum effort, which would be reflected in fixed capital structures.

In Whebell´s definition, the corridor is a historically persistent element (Whebell, 1969:1). However, in recent decades, the term corridor has also been used to designate suburban centers, some of which are characterized as growing too fast, emerging in contexts of a favored urban dispersion through the use of the automobile and the growing provision of urban arterial roads and high speed roads, as well as the dispersion of activities in the territory such as commerce and employment. Those elements locate increasingly more far from the traditional Business Center District (BCD), as in the case of North American and Canadian cities, in which market forces have given way to the conformation of agglomerations called suburban centers (Filion, 2001:141).

These centers contain a variety of activities with a strong component of employment and retail trading, developed with a density much greater than the suburban standard (Garreau, 1991 in Filion, 2001: 142). Several criterion have been proposed to differentiate types of suburban centers. Within the morphological criteria, geographers Truman Harsthorn and Peter Muller (Harsthorn and Muller, 1989, in Knox, 1994:134) have identified several geometric ways that suburban centers present, depending greatly on the local conformation of highways, high speed roads, and land available for the development. In this way they identify two main forms: the compact and most common form which are *Nucleated centers*, and the lineal form, which are *Corridors.*

Without a doubt, the use of the automobile in North American and Canadian cities has been a determining factor, which has favored urban dispersion, but in Latin American cities, this dispersion seems to be not present with such magnitude, and the phenomenon of corridors can be understood under another context.

The historic persistence of linear communication routes in the structure of the Latin American city has been mentioned by Terrazas for the specific case of Mexico City (1988: 86), by explaining that the concentration of urban activities located along the axis and generally on communication routs has accompanied the growth of Mexican cities since practically the colonial period. The author indicates that in spite of the city´s growth, the operation of the royal road cannot be maintained, but in the historic development of the structure of the metropolis, the phenomenon has remained. Subsequently, Terrazas reaffirms this idea referring to the main communication and transportation routes in the city´s interior as the representation of a pattern of axes or roads that correspond to a concept of replanted centrality, which does not necessarily coincide with the traditional center of the cities (Terrazas, 2005; 2010: 9).

Likewise, when referring to the structuring of Mexico City, Pradilla (2013:226-227) describes how the ancient centrality tended to be organized on its most important axes where "Sub centralities extended over the axes of material flows of people and vehicles until losing their centric form and articulating several of them, weaving in and out of the network" (Pradilla, 2013:226-227). These corridors are composed of commercial plazas and centers, small and medium stores bank offices and other financial activities, private and public services aimed at economic activities, repair services, hotels, restaurants, entertainment places and management offices, among other uses (Pradilla, 2013: 227).

In this way, in the specific case of Mexico City, the corridors are the central element for explaining a new logic of urban structuring, a network of urban tertiary corridors whose logic and effects "are essential for the interpretation of the present and the designing of the future of one of the largest concentrations of the planet" (Pradilla and Pino, 2004:71). So it would be necessary to design specific regulations according to its hierarchy and composition (ibid: 87).

On the other hand, urban planning has characterized the corridors according to what they should be and has typically considered corridors as another one of its instruments in the development of an urban zone, and generally in a local manner. Each department in charge of planning and consolidating corridors defines the characteristics and main functions of the corridors.

In Latin America, perhaps the best known example of this scheme is the Management Plan of the city of Curitiba, Brazil. Since 1970, in this city, the physical planning strategy has been the location of commercial and industrial developments along the four radial corridors starting from the central area. These corridors have been developed along main routes, mostly on existing roads, whose transportation system has stations every 400 meters, providing suburban and peripheral points of attraction for commercial investment (Devas and Rakodi, 1993: 159-160). One of the most immediate impacts of this system has been "the consolidation of the axes of commercial activities and previously existing services as structured urban corridors" (Salazar, 2008: 78-80).

In Mexico City, the *urban corridor*, together with *urban centers* and *sub centers*, supported by transportation and the road network, were proposed in the Urban Development Plans in the decade of the eighties as the components of an Urban Structure, which constituted the "physical framework" of the Federal District. This plan considered that the linear form of the corridors allows a large coverage of the entire urbanized zone to be constituted

in strips which accommodate high densities of population and the largest concentrations of service establishments and work sources, including non-pollutant industries (DDF, 1983).

Following the guidelines of that plan, the strategy indicated the convenience of forming them through the intensification of the use of land on the axis of those lines of collective transportation. These corridors had been selected taking into account the high densities of existing populations, the relative distance between one another to balance zones of influence, their function as a link to Urban Centers and their length. The manner of intensifying the use consists of developing small stretches mixed with services, housing and industry along the corridor through the collective transportation system (DDF, 1983).

After more than three decades, the concept of urban corridor continues to appear in urban development plans as one of the elements of urban structure, together with urban centers, urban sub centers and neighborhood centers (PGDUDF, 2003), a distinction is made between low intensity corridors, regional corridors and commerce and services corridors (SEDUVI, 2014).

Methodology

According to the reviewed theory, the number of variables to identify a "typology of corridors" was 30 (see Table 1), which in principle expressed the difficulty of building families of corridors in a one-single dimension, that is, using only variable pairs (for example, distance to center and length of the corridor, or average height and number of lanes per corridor). A method which contemplates at least three dozen variables is required, for which a multi-varied method was resorted to.

The use of multi-varied methods in studies of urban form is not new, and there are examples that show that techniques of semi-automatic classification of data patterns according to multiple variables reveal the construction and types of urban forms in a systematic way (Gil, et. al, 2012: 27-40).

According to Escofier and Pages (1992), multi-dimensional methods extract the most outstanding tendencies of data which is too numerous to be directly apprehended, they establish a hierarchy for them and eliminate marginal or specific effects which disturb the global perception of the facts (ibid.). One of these methods is the Main Component Analysis (MCA), which applies to bi-dimensional tables that cross individuals and quantitative variables, with the objective of forming families of variables whose behavior is correlated (Kunz, 1988: 20). With regards to individuals, what is intended to be evaluated is their similarity, and with regards to pairs of variables, what is intended to be evaluated is their relation (Escofier and Pages, 1992).

Concerning individuals (corridors, in this case), the ACP has the objective of responding to questions such as: what individuals are those that resemble each other? What individuals are those that are different? Are there homogeneous groups of individuals? And the most important question: can a typology of two individuals be demonstrated? (ibid).

Concerning the variables (in this case, the characteristics of the corridors), we look for answers to questions such as: What variables appear as being related to each other? Which are the variables that are independent? Can a typology of variables be evidenced? Are there groups of variables related to each other? (ibid).

If the answer to this last question is affirmative, there will be a group of synthetics called main components, a type of "representative" (the synthesis) of a group of variables related to each other (ibid.). In the ideal case, both typologies (individuals and variables) are superimposed, that is, that each group of variables characterizes a group of individuals and each group of individuals brings together the individuals typical of a group of variables, but the possibility of this is to happen is very low (ibid). In general, it is sought to relate both typologies. For this, the classes of individuals are characterized by variables, and likewise a group of variables related amongst themselves are characterized.

To perform the study, the *Cadastral Value Corridors* (see Figure 1) were considered. This is a concept created by the Department of the Treasury of the Federal District, which refers to a set of plots adjacent to a public road of the Federal District with intense economic activity. They have and higher commercial value of the land in comparison to the

Table 1. Considered variables for the classification of urban corridors
(Source: own elaboration based on literature review)

Variable	Indicator	Description
Land use	Residential land use	Single-family Single-family with commerce and services
		Multi-family Multi-family with commerce and services
	Commercial land use	Regional, Local, Neighborhood and for Convenience. Specialized self/service store and specialized Commerce in roads
	Services land use	Neighborhood, Local, Regional, and Metropolitan. Personal, technical, professional, social assistance, administrative, financial, lodging, feeding and finally, grouping services. Private or Public.
	Industrial land use	Local industry and interior industry
Accessibility	Central as well as local	For central accessibility, the distance to the city´s center (Zócalo) from the centroid of each analysis unit. As a local accessibility measurement, the number of lanes measures the service capacity of the corridor.
Location	The position of the sector where the corridor locates (measured in degrees with regard to the city´s center).	
Land use intensity	Arithmetic average of the number of levels of each analysis unit, in which all buildings will be included, including open spaces and green areas.	
Length of corridor	The total length of the corridor expressed in Kilometers.	
Number of plots	Total lots contained in each corridor.	
Average length of plot fronts	Expressed as the division of the length of the corridor/number of plots.	
Number of works under construction	The initial phase of the building´s economic cycle, which is an indicator of the investment in the corridor, which give account of the location advantages that the corridor provides.	
Deteriorating and abandoned plots	The final phase of the building´s economic life. Shows that in the majority of cases, the cost to replace the structure is greater than the future income that it can report, therefore the selection of this corridor cannot be offering many location advantages and there is no competition to occupy these places.	
Number of vacant plots	As an indicator of the corridor´s saturation process.	
Subway stations	They are transportation services. Their presence can reveal, according to the theoretical framework, the induction of private investments and intensification of land use.	
Parking lots and garages	They are temporary vehicle confinement services considered as indicators of land use intensity. These establishments are of little relevance, but as indicators of vehicle concentration, their presence is very important.	

Figure 1. Location of urban corridors with a cadastral reference value in Mexico City. (Source: own elaboration based on cadastral reference values).

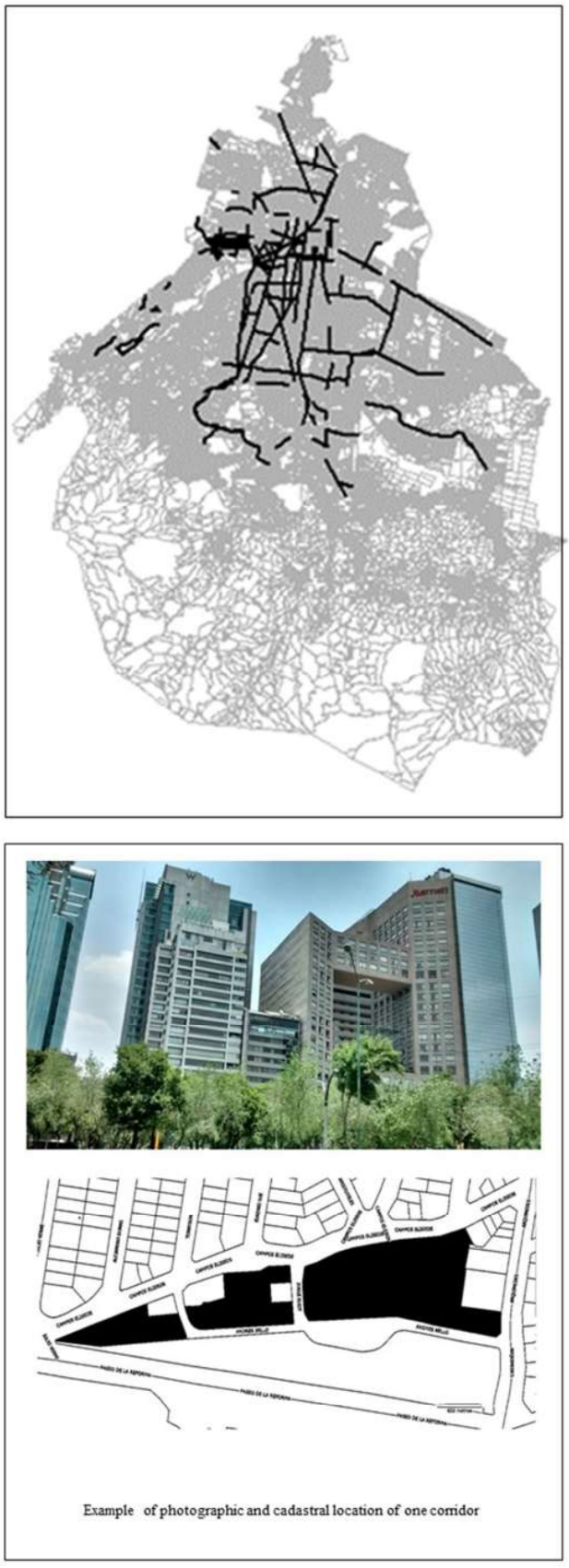
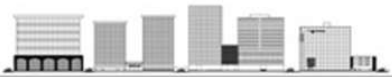
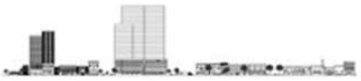
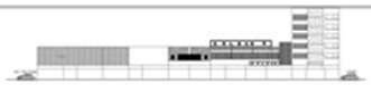
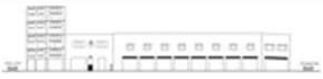


Table 2. Main component analysis for the classification of urban corridors

Variables	Main Components									
	1	2	3	4	5	6	7	8	9	10
Average of the number of storeys	**0.896**	0.042	-0.064	-0.024	0.193	-0.157	0.179	-0.125	0.098	0.019
Location of the corridor sector	**0.718**	0.048	-0.29	0.258	-0.227	0.016	-0.211	0.191	0.047	0.129
Regional services	**0.705**	0.315	-0.009	**0.447**	-0.111	0.03	0.019	-0.231	-0.123	-0.021
Cadastral reference value	**0.655**	-0.014	-0.149	-0.023	-0.175	0.194	0.078	-0.060	0.274	0.388
Length of corridor/number of plots	0.595	0.136	0.425	-0.117	0.31	-0.22	0014	-0.060	-0.003	-0.128
Metropolitan services	0.544	-0.11	0.050	-0.169	0.27	-0.301	0.218	0.163	-0.004	0.07
Multi-family residential use	0.43	-0.235	-0.12	-0.369	**0.523**	-0.154	-0.01	0.15	0.056	0.029
Number of lanes	0.092	0.198	0.052	**0.44**	0.343	**0.416**	0.15	0.053	0.016	-0.29
Parking lots	0.054	**0.657**	0.256	0.014	0.044	0.166	-0.444	-0.021	-0.227	0.098
Regional commerce	0.031	-0.398	0.331	-0.044	**-0.495**	0.142	-0.151	0.176	0.099	0.101
Subway stations	-0.034	**0.667**	0.21	-0.054	0.044	0.098	-0.376	0.161	0.153	-0.224
Distance to the Zócalo	-0.041	**-0.665**	0.546	0.19	0.106	-0.275	0.012	0.050	-0.078	-0.020
Specialized self-service stores	-0.042	-0.291	0.379	0.352	0.178	0.268	0.096	0.245	0.274	-0.064
Interior industry	-0.51	0.196	0.169	-0.398	-0.275	0.084	0.317	-0.447	0.282	-0.409
Length of corridor (Kms)	-0.139	-0.309	0.0004	0.293	0.391	**0.479**	0.124	-0.119	0.362	0.138
Single-family residential use	0.167	**-0.692**	0.030	-0.27	0.098	0.059	-0.475	0.030	0.059	-0.051
Specialized commerce in roads	-0.167	-0.166	0.159	-0.156	0.249	**0.395**	0.306	0.138	-0.594	0.030
Local services	-0.187	0.356	-0.17	0.432	0.128	0.059	-0.084	0.369	0.175	-0.107
Neighborhood commerce	-0.198	0.377	**0.649**	-0.181	0.13	-0.032	-0.050	0.243	0.15	0.11
Multi-family residential use with commerce and services	-0.212	0.186	**-0.674**	-0.172	0.059	0.318	0.117	0.194	-0.062	0.097
Neighborhood services	-0.247	-0.035	0.318	**0.699**	-0.152	-0.17	0.103	-0.292	-0.181	0.183
Commerce of non-food products	-0.283	0.461	0.275	-0.329	0.251	0.032	0.039	-0.224	0.0008	0.375
Local commerce	-0.346	0.29	0.246	-0.13	-0.343	-0.01	0.507	0.262	0.197	0.183
Convenience commerce	**-0.504**	0.212	-0.257	0.173	-0.041	-0.449	0.304	0.174	-0.0003	0.028
Local industry	**-0.507**	0.029	-0.07	0.093	0.357	-0.13	-0.245	-0.28	0.177	0.338
Single-family residential use with commerce and services	**-0.625**	-0.138	-0.356	0.058	0.269	-0.181	-0.098	-0.179	0.117	-0.164
Percentage of explained variance	16.867	11.904	9.105	7.894	6.636	5.607	5.435	4.219	3.888	3.55
Accumulated percentage of explained variance	16.867	28.772	37.877	45.771	52.406	58.013	63.448	67.667	71.555	75.105

predominant one in the zone (DDF, 2001). From a universe of 179 corridors, 104 corridors were selected, according to their value per square meter, and under the assumption of an inverse relation between residential use and the value of the land. That is, the higher the corridor value, the higher the percentage of non-residential land uses. Thus, a survey on the use of the land from the area of study was taken and a data base with a total of 12,400 observations was made. The results of that analysis are summarized in the following.

Figure 2. A proposed typology of urban corridors in Mexico City.

Height	Residential use intensity	Description	Morphology
I	I-B	1. Maximum land use-intensity corridors (8.87) oriented to services	
	I-C	2. Maximum land use-intensity corridors (10.24) oriented to residential use	
II	II-A	3. Maximum land use-intensity central corridors (9.03) oriented to services	
	II-B	4. High land use-intensity corridors (5.32) oriented to services and residential use	
	II-C	5. High land use-intensity corridors (5.40) oriented to residential uses and regional commerce	
III	III-A	6. Medium land use-intensity central corridors (3.76)	
	III-B	7. Medium land use-intensity corridors (4.05) oriented to services	
	III-C	8. Medium land use-intensity corridors (3.57) oriented to single-family residential use	
IV	IV-A	9. Medium land use-intensity corridors (3.04) oriented to local commerce	
	IV-B	10. Medium land use-intensity corridors (2.94) with mixed use	
	IV-C	11. Medium land use-intensity corridors (2.45) oriented to single-family residential use	
V	V-A	12. Low land use-intensity corridors (2.07) oriented to commerce	
	V-B	13. Low land use-intensity corridors (2.14) oriented to residential use	

Results

From the analysis, it was observed that the total of the common variation between variables is explained up to component number 26 (see Table 2). As can be seen, the first eight components explain 67.66% of the total variance. The rest can be considered of little statistical relevance. So these first components were considered to make the classification.

To know the nature of each component, the variables with a higher degree of association regarding each component are considered, in which the values that tend to be +1 or -1 indicate direct or inverse association, while zero values indicate independence in a way that is similar to the level of correlation.

If the variable-component matrix is ordered in a way that is decreasing regarding component 1, the following variables are directly associated: the average number of levels, the location of the corridor´s centroid, the regional services, the land value, the occupation density (Corridor length/number of plots) and the metropolitan services. Single-family housing with stores and services, local industry and convenience stores appear inversely. This first component seems to associate a dimension of "corridor use intensity", which in addition to being so in a physical sense, is also in a functional sense upon inversely relating activities with regional and metropolitan service thresholds, and on the other hand, activities limited to the radius of a neighborhood (such as convenience stores and local industry).

The second component directly associates the number of subway stations and parking lot services, and inversely the single-family residential use and the distance to the Zócalo (the center of the city). As previously mentioned, the percentage of residential use is very high, and more in some corridors than in others. This component shows the level of "centrality-residential specialization". On one hand, areas without housing, with parking lots and collective subway transportation; and on the other hand, areas of residential use far from the city, which exclude mixture with stores and services, without transportation stations or parking lots.

The third component inversely associates neighborhood commerce with multi-family residential use with stores and services. This can again be a dimension of the corridor´s "morphology, given that the availability of land for neighborhood commerce is higher in less densely populated areas than in areas in which these uses have to be accommodated on the upper floor of vertical condominium buildings. Additionally, the distance to the center appears inversely associated to this type of housing, which seems to confirm its location.

The fourth component indicates the presence of neighborhood services, and to a certain extent associates them with regional services and the number of lanes. This component seems to associate complementary land uses, for regional services, mostly offices. Offices are generally surrounded by Bank branches, fast food restaurants or photocopying centers (neighborhood services). On the other hand, the presence of regional services has a logical association relation to the number of lanes, which increases the service capacity of the corridor.

Component number five inversely related the multi-family residential use to the regional commerce. This component again gives an idea of the "density" of the corridor through this association of variables. Regional commerce, mainly formed by commercial centers, requires large extensions of land that allow the location of department stores and sufficient space for the arrival and parking of vehicles. These necessities give as a result an immediate open spaced urban context and low use intensity.

Component number six indicates the presence of specialized commerce, inversely related to the convenience stores and directly associated to the length of the corridor and number of lanes. If we think about automobile sales as an example of specialized commerce, it will be logical to assume that this market requires a location that is very accessible, which additionally supports an intense volume of traffic; in a way that it can maintain a certain frequency of sales.

In these six components, 21 variables of the 26 originals are interpreted. The remaining variables do not significantly figure in the first components or in the remaining ones, which can be attributed to more specific reasons.

Subsequently, to determine the location of each corridor in each one of the dimensions explained by the components, the standardized data or scores of each corridor was taken into account with regards to the components, that is, the location of each corridor with regards to each component, expressed by standard deviations above or below the average.

The amount of objects worked in this case is such that if too many components are considered, the number of final combinations will prevent generality from being achieved. For this reason, it was decided to consider only the first four components.

The first component was divided into six groups, attempting to keep a relation between the number of ranges and the variance explained by each component. The second component was divided into three ranges; it was opted to consider the fourth component and not the third due to the relation of the variables associated with it: neighbor-

hood commerce seems to have not a specific location logic, as opposed to neighborhood services, which constitute a complementary land use for regional services.

In the first component, the ranges were indicated through roman numerals (see Figure 2). Group I associated the corridors of higher intensity, and thus successively until reaching group V, of low intensity corridors; the presence of single-family residential use was measured by three ranges, A, B, C, where A indicates the largest value; and finally, the fourth component was divided into ranges 1 and 2 (high or low proportion of regional and neighborhood services).

This gave as a result thirteen types of corridors, which were characterized according to the average values of all the variables (see Figure 2). For example, the IB type means that it has high values in the significant values of the first component, but an intermediate value in the significant values of the second component, that is, its use intensity is one of the highest, its location is not so central and it has an elevated percentage of land use designated to regional services.

On the opposite side, we find the V-A and V-B corridors type, with low values in the variables of the first component (use intensity or number of levels) and an elevated percentage of commercial and residential use.

Conclusion

In the case of Mexico City, land use intensity turned out to be the most significant variable in the differentiation of the corridors studied. The average number of storeys of the corridors, as a variable for land use intensity, was found to be closely related to regional services, and additionally, to the location of the sector of the corridor, which indicates the possibility of recognizing a sector structure tendency.

Secondly, the corridors could be differentiated according to the uses related to centrality. The greater or lesser presence of single-unit residential use, as opposed to uses such as collective transportation stations or parking garages, turned out to be a significant aspect in corridor distinction. It is important to mention that 46% of the total use of corridors is residential and mixed-residential. Thus, the importance and effect of residential land in the corridors was evident, so their mixed and low intensive nature to be understood. However, these two phenomenon are independent from each other, that is, the centrality is independent from the land use intensity and vice versa. The location of vertical structures of greater use intensity does not depend on the centrality. A very important aspect is the consideration of socio-economical type variables which were not included in this study, but can be very important in identifying the characteristics of the population with the respective land use patterns.

On the other hand, the need of a common definition of corridors as planning instruments is notorious. The definition of *corridors with a cadastral reference value* tries to exclude residential use, while *planning urban corridors* in fact include the high residential densities on the corridors. According to the results of this study, both definitions coincide with that observed.

Considering the corridors as elements of articulation between activity centers is a task that requires a much more complex analysis because it includes the entire urban system. In this sense, the consideration of the transport network together with the land use variables and the mobility demand is fundamental to identify the attraction centers and from there, the potential of the corridors to serve as supporting elements of planning. Some corridors, more than connectors between centers, can be destinations in themselves. Other corridors are merely transition centers of activity. Others have an origin and do not have a destiny while others are simply dispersed. Such qualities would modify their function within a general scheme.

Finally, we can conclude that the lack of market mechanisms that make pressure in favor of a more intensive use of the land, -such as low property taxes, do not recognize the value derived from the development potential. This occurs in low occupation areas with high intensity potential, but where the options of re-development and intensification were suspended and canceled because of urban regulation.

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References

DDF (1983), *Plan General de Desarrollo Urbano de! Distrito Federa*l, Departamento del Distrito Federal (Secretaría de Obras y Servicios, Dirección General de Planificación, México).
DDF (1997), *Manual Administrativo de la Subtesorería de Catastro y PadrónTerritorial de la Secretaría de Finanzas del Departamento del Distrito Federal.*
DDF (2001), *Código Financiero del Distrito Federal* (Editorial Sista, México).
Devas Nick and Rakodi Carole (1993), *Managing Fast Growing Cities, New approaches to urban planning and Management lo the Developing World* (Longman Scientific and Technical, Essex, England).
Escofier, B., Pages J. (1992), Análisis factoriales simples y múltiples, objetivos métodos e interpretación (Servicio Editorial de la Universidad del País Vasco, Bilbao).
Gil, J. et al. (2012) 'On the discovery of urban typologies: data mining the many dimensions of urban form', *Urban Morphology* 16, 27.
Gobierno del Distrito Federal, *Programa General de Desarrollo Urbano del Distrito Federal (PGDUDF)*. (http://www.seduvi.df.gob.mx/portal/docs/programas/programageneral/031231_PGDU.pdf). Accessed: 09/2014.
Knox ,P.L. (1994), *Urbanization, An introduction to Urban Geography* (Prentice Hall, Englewood Cliffs, New Jersey).
Kunz, I. (1988), *El Uso de Estadística para la Construcción de Clasificaciones y regionalizaciones*, Serie Varia T, 1, Num 11, UNAM, México.
Pradilla, C.E., "La economía y las formas urbanas en América Latina", en Blanca Rebeca Ramírez Velásquez y Emilio Pradilla Cobos (Comps.), *Teorías sobre la ciudad en América Latina*, tomo I (Universidad Autónoma Metropolitana, México DF, México, 2013) 169-238.
Pradilla, C.E. and Ricardo, P.H. (2004), "Ciudad de México: de la centralidad a la red de corredores urbanos", *Anuario de Espacios Urbanos*, 2004, División de Ciencias y Artes para el Diseño (Universidad Autónoma Metropolitana, Azcapotzalco, México DF, México) 70-96.
Priemus, H., and Zonneveld, W. (2003) "What are corridors and what are the issues? Introduction to special issue: the governance of corridors". *Journal of Transport Geography* 11, 167-177.
Salazar C.C.E. (2008) "Los corredores confinados de transporte público en las metrópolis latinoamericanas: ¿una oportunidad para hacer ciudad?", en Salazar Cruz, Clara Eugenia y José Luis Lezama, coordinadores. *Construir Ciudad, un análisis multidimensional para los corredores de transporte en la Ciudad de México* (El Colegio de México. 2008) 43-107.
Sap, H. A. (2007), "Corridors and/or Linear Cities; a Historic Contribution to Contemporary Discussion on Corridor Development", Faculty of Building and Architecture: Urban Design Group, Netherlands: Eindhoven. University of Technology (http://www.hasarchitectuur.nl/res/article-sap-corridorhistory.doc) accessed 09/ 2014.
Secretaría de Desarrollo Urbano y Vivienda. *Programas delegacionales de desarrollo Urbano* (http://www.seduvi.df.gob.mx/portal/index.php/programas-de-desarrollo/programas-delegacionales) accessed: 12/2014.
Terrazas, Revilla (2005), Los caminos de la metrópoli, el caso corredor Tlaxcala-Puebla (UAM/CONACYT).
Terrazas, R. O. (1988), "De la ciudad central a la ciudad interior", en Oscar Terrazas y Eduardo Preciat, *Estructura territorial de la ciudad de México* (Plaza y Valdés y Departamento del Distrito Federal, México) 81-100.
Whebell, C. F. J. (1969), "Corridors: a theory of urban systems". *Annals of the Association of American Geographers*. Vol. 59, March 1969, Num. 1, 1-26.

Chair_Attilio Petruccioli I Decio Rigatti
Department of Architecture and Urban Planning, Qatar University, Doha, Qatar
Uniritter, Laureate International Universities, Brazil
Co-Chair_Susanna Clemente I Ylli Taci
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

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Typological Process
Urban Growth

Dynamics of Chinatowns' evolution in Australia: new visions for urban life?

Hing-wah Chau, Karine Dupre, Bixia Xu
The University of Melbourne, Parkville, 3010 Victoria, Australia
The University of Melbourne, Parkville, 3010 Victoria, Australia
Griffith University, Southport, 4215 Queensland, Australia
Keywords: Chinatown, urban morphology, urban resilience, organicity

Abstract

Traditionally, it is understood that Chinatowns have developed organically, according to the different stages of the Chinese migrants' settlements, and rather independently from city planning prior to becoming embedded in its vision. However, because of the nature of Chinatown development, very few morphological studies have been made possible and conducted. This is the case in Australia as well, where there is an additional specificity: the creation of Chinatowns by government planning forces since the 1980s. Based on M. R. G. Conzen's method of plan analysis and burgage cycle, the aim of this paper is to present the morphological transformations of Melbourne Chinatown and compare it with two other Australian Chinatowns (Brisbane and the Gold Coast) in order to document the changes in the weight and role of Chinatowns in cities. Melbourne Chinatown organically developed after the Gold Rush in 1851, while Brisbane and Gold Coast Chinatowns with local government support were formally opened in 1987 and 2015 respectively. Although these Chinatowns have different historical formation, their urban forms share some similarities - strongly influenced by the traditional colonial pattern of development with regular land division, and followed by the amalgamation or subdivision of plots prior to later redevelopment. By using historical and contemporary cartographic records, photographic surveys, and field observation, we aim to reveal the dynamics of evolution of Chinatowns and hence unveil their contribution to new visions for urban life in today's city.

Introduction

Chinatown is commonly regarded as a Chinese migrants' settlement, which evolved organically in relation to the societal context and rather independently from city planning. Many scholars have already unveiled the logics in place in term of mobility, diaspora, identity and ethnicity (Ma & Cartier, 2003; Anderson, 1991; Christiansen, 2003). There have been a few concerns with the spatial features of Chinatowns (Wu, 2003; Chuang & Tremon, 2013; Hearn, 2013). Since there are very few morphological studies in relation to the nature of Chinatown development, this paper aims to provide a historical review of the evolution of Melbourne Chinatown in Australia from a morphological perspective and compare the organicity of such urban form to the newly Australian emerged Chinatowns in Brisbane and the Gold Coast with respect to the new visions for urban life they represent. Through these case studies, the dynamics of the Chinatowns evolution in Australia can be illustrated and their contribution to new visions for urban life in today's city can be unveiled.

Methodology

Conzen's study of Alnwick (1960) made a significant contribution to the development of urban morphology. He recognized the tripartite structure of the town-plan: street-system, street-blocks, and buildings or block-plans. Through the analysis of the evolution pattern of land, he identified the phenomenon of progressive infilling of plots with buildings and subsequent demolition leading to redevelopment and amalgamation. The burgage cycle is regarded as an important concept developed by Conzen (Whitehand, 1981, p.130). Based on this morphological approach, historical and contemporary cartographic records, photographic surveys and field observation of the case studies were used for examining the dynamics of their evolutions and developing Nolli maps, that represent the figure-ground relationships of urban forms.

Specifically for Melbourne, fire insurance maps of 1888, 1910, and 1948 prepared by the Mahlstedt and Gee Surveyors and Draughtsmen collected at the State Library of Victoria, together with the City of Melbourne Interactive Map in 2015, prove to be very useful for preparing the Noli maps. By compiling the information on Mahlstedt historical maps and the maps drawn by Blake (1975) based on the Sands and MacDougall directories with Chinese name entries, it is also possible to identify the distribution of Chinese-related functions along the Chinatown's main street and adjoining laneways.

This paper is focused on the area bounded by Swanston Street, Lonsdale Street, Russell Street, and Bourke Street. Although early Chinese migrants also lived in other parts of the city, especially along Little Lonsdale Street and Larobe Street (Blake, 1975), the selected area is the long-standing, well-established Chinatown in Melbourne from the early establishment to nowadays. Besides, four gateways were installed along Little Bourke Street in the 1970s to define the entrances of Melbourne Chinatown, so the distribution of Chinese related functions along Little Bourke Street and adjoining laneways is studied in this paper.

In parallel with the evaluation of physical urban conditions, the context of associated economic and social development is also involved in this analysis. Site surveys were undertaken to identify different types of activities in each Chinatown. As stated by Conzen,

> ...it is important to realize that town plans originate, develop, and function within a physical and human context without which they remain incomprehensible...Towns have a life history. Their development, together with the cultural history of the region in which they lie, is written deeply into the outline and fabric of their built-up areas (Conzen, 1960, p.6).

Melbourne Chinatown in the 1880s

In 1837, the Hoddle Grid, designed by the surveyor, Robert Hoddle, was laid out in Melbourne, which has become the development framework of the Melbourne CBD and still works as such today. Three rows of eight street-blocks were superimposed next to

the Yarra River regardless of the natural features of the site. Parallel to main streets of 99 feet wide (approximate 30 metres), secondary streets of 33 feet wide (approximate 10 metres) were provided in the east-west direction to divide each street-block into half for providing rear access to future allotments (Turner, 1967, p.32). The width of each street-block facing a main street was 200 metres and the depth of each bisected street-block on either side of a secondary street was 100 metres (Lewis, 1994a, pp.25-26). Each street-block was subdivided into 20 plots. Plots in the middle were long narrow strips compared with plots at street corners. Each plot had two street frontages, one facing a main street and another one facing a secondary street, except corner plots. Facing the influx of settlers, the first land sale was held in 1837 followed by subsequent sales in 1839 and 1840.

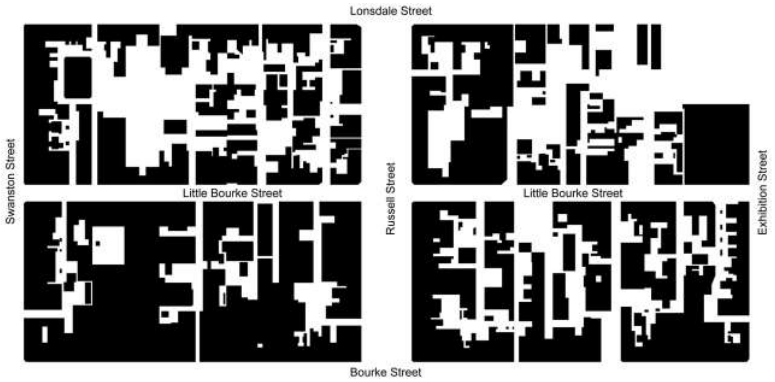
The development of Melbourne Chinatown was closely related to the Gold Rush. After the discovery of gold in 1851, Chinese started to arrive at Victoria in large numbers. A population of about 2,000 Chinese was estimated in 1854, which was increased to 17,000 in 1855 (Serle, 1963, pp.321-323). Most of them came from the impoverished southern provinces in China (Blake, 1975). In the beginning, Melbourne was merely a temporary staging post on the journey to the goldfields. They gathered along Little Bourke Street which was in fact a ghetto on the outskirts of the city. Once a Chinese settled in this street, others preferred to live in close proximity to one another for social bonding within the overall western environment. Due to language barriers and cultural differences, it was difficult for them to integrate into mainstream society, resulting in an ethnic enclave there (Melbourne City Council, 1985). Lodging houses offering low rents and shops providing essential commodities emerged for transient Chinese gold miners. Gambling halls, opium dens, and brothels also appeared for lonely Chinese migrants. The area became a fearful slum with notorious reputation (McConville, 1985, p.58; Anderson, 1990, p.141), which was in sharp contrast to the surrounding clean-kept streets and lofty buildings of Melbourne centre.

As the city was developed, land became more valuable. Plots were then subdivided and access roads were provided for accessibility, resulting in a labyrinth of narrow laneways within the planned and regular orthogonal Hoddle Grid. The same process was seen in the Chinatown neighbourhood, with noticeable straight-through laneways that were connecting the thoroughfare (Little Bourke Street) to its north and south equivalent (Lonsdale and Bourke Streets). This increased the permeability of the street-blocks in the north-south direction, while at the same time, the formation of dead-ends laneways limited the traffic flow and increased the sense of privacy for the neighbourhood (Figure 1a). Compared with laneways in the north-south direction, there were fewer laneways in the east-west direction. The permeability in the east-west direction mainly relied on Little Bourke Street rather than laneways.

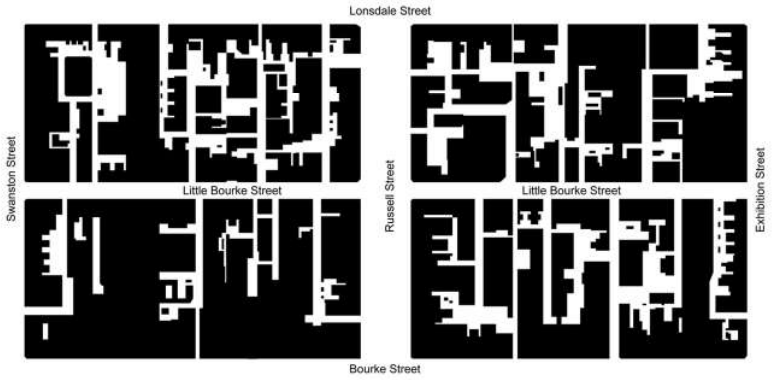
Most buildings were made of timber or brick with one to two storeys high (Blake, 1975). They were often located on the periphery of street-blocks facing main or secondary streets, leaving open backyards. As shown on the 1888 Mahlstedt Map, central portions of some plots in the upper part of Chinatown were merely open yards (between Lonsdale Street and Little Bourke Street), whereas some plots were still undeveloped (the corner of Lonsdale Street and Exhibition Street).

Throughout the 1880s, Melbourne Chinatown played an important economic role. With the decline of gold mining in Victoria, Chinese fruit wholesalers and furniture makers boomed, which did not only serve the Chinese community, but the general population of Melbourne. Through a trading network with Chinese farmers in Queensland, Chinese merchants basically controlled the wholesale market of bananas, tropical fruits and vegetables in Melbourne (Melbourne City Council, 1985, p.11). Chinese furniture makers, who lived in Chinatown, were also famous for their high quality workmanship and competitive pricing (McConville, 1985, p.65). Chinatown was gradually transformed from a lodging place for gold miners in the beginning to a centre of furniture making and fruit wholesaling in Melbourne. The 1888 Mahlstedt Map clearly shows the names of some Chinese shops, which were mostly furniture and importers (Figure 2a). Apart from settling along the main axis and gathering there for religious function in Chinese churches or community-let activities in Chinese associations (such as the Num Pon Soon Society), Chinese people worked and lived within the intricate network of laneways nearby. Yet, diversity was also present, revealed by the existence of non-Chinese activities such as a

Figure 1. Nolli maps of Melbourne Chinatown based on Mahlstedt Maps. a: 1888, b: 1910, c: 1948, d: 2015

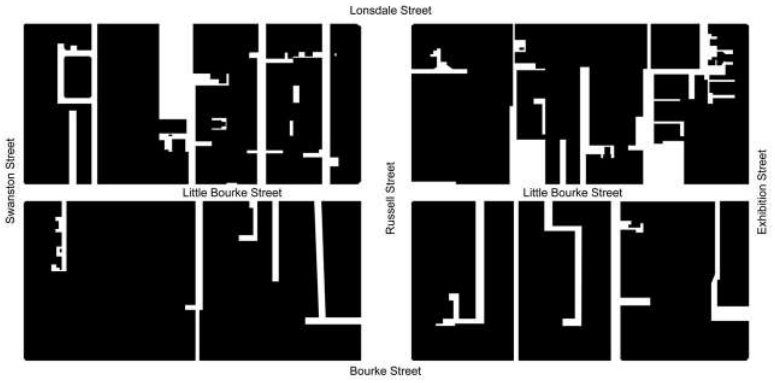


a. 1888



b. 1910

c. 1948



d. 2015

billiard table manufactory and two theatres (the Theatre Royal and the Alexandra Theatre), which were the three largest buildings of the area.

Melbourne Chinatown in the 1910s

The 1910 Mahlstedt Map evidences substantial filling or redevelopment of the plots. The amount of large buildings increased, for example, the Theatre Royal extending fully southwards towards Bourke Street and, adjacent to the Theatre Royal, the erecting of the Hoyts Picture Theatre (or Hoyts Cinema) instead of demolished smaller size buildings. Similarly, the Tye & Co. Furniture Warehouse replaced small buildings and combined different plots together between Little Bourke Street and Bourke Street. The empty corner site of Lonsdale Street and Exhibition Street was developed, whereas the Garton Motor Garage filled up the former open yard between Lonsdale Street and Little Lonsdale Street. Although some plots were amalgamated, the previous laneway system and permeability were basically maintained (Figure 1b).

Yet, overall, the above-described processes paralleled the emergence of a strong White Policy in the country. Clearly early Chinese migrants were discriminated by the Australian community. The Anti-Chinese League was established in 1879 and an Anti-Chinese Committee was formed within the local labour union in 1893 (Markus, 1974, pp.1-4). In order to protect Australian and European industries and markets, several acts were enacted in the following decades. For example in 1896, under the Factories and Shops Act, furniture was required to be stamped with the details of the manufacturer for encouraging customers to buy Australian products. Following the White Australia Policy in favour of European migrants, the Commonwealth Parliament passed the Immigration Restriction Act in 1901 requiring applicants to pass the dictation test (Palfreeman, 1967). This was an effective way to keep away unwanted Chinese immigrants. For those Chinese residents who could stay in Australia, they did not have the right to vote and their wives and children were not allowed to come for family reunion. Under legal restrictions, it was difficult for young Chinese workers to pass the language test and aged workers to be replaced after retirement.

Due to these discrimination policies, the number of Chinese population dropped drastically from a peak of 45,000 in 1859 to 4,707 in 1911 (Young 1868, p.21; Blake 1975, p.42). The fall of the Qing Dynasty and the establishment of the Republic of China in 1912 also attracted early Chinese migrants to return to their homeland. Despite various discriminative restrictions, the 1910 Mahlstedt Map shows the opening of new businesses that were less dependent on restrictions, such as cafes and restaurants (Figure 2b).

Melbourne Chinatown from the 1940s to the 1970s

The last available Mahlstedt Map covering Melbourne Chinatown used the base plan in 1948. However, these maps were updated by the Mahlstedt and Gee Surveyors and Draughtsmen from time to time by pasting overlays when buildings were built, altered, or demolished. The overlays were not dated and existing maps held by subscribers might continue to be used, so it was likely for the 1948 Mahlstedt map to include later development (Lewis, 1994b, p.2.9). In fact, the information covered by this Mahlstedt map ranges from the erection of the Golden Square Car Park in 1953 to the demolition of the Kong Chew Society building in 1972.

Basically during the 1940-1970s period, extensive plot amalgamation and large footprint buildings were evidenced. Large shopping and entertainment centres emerged in the south of Little Bourke Street, including the Coles Stores, the Watsons, the Cinema Centre, and the Palladium Entertainment Centre. After redevelopment, some laneways were shortened, such as Pender Place in the north as well as Star Alley and Hughs Alley in the south. Some laneways were even totally disappeared – Dawson Place at the corner of Swanston Street and Bourke Street as well as Star Lane after the completion of the Palladium Entertainment Centre. The Nolli map shows contrasting characteristics of urban fabric on both sides of Little Bourke Street with more fine-grained texture in the north. The

permeability of plots after amalgamation in the south more relied on internal circulation of shopping and entertainment centres rather than open laneways (Figure 1c).

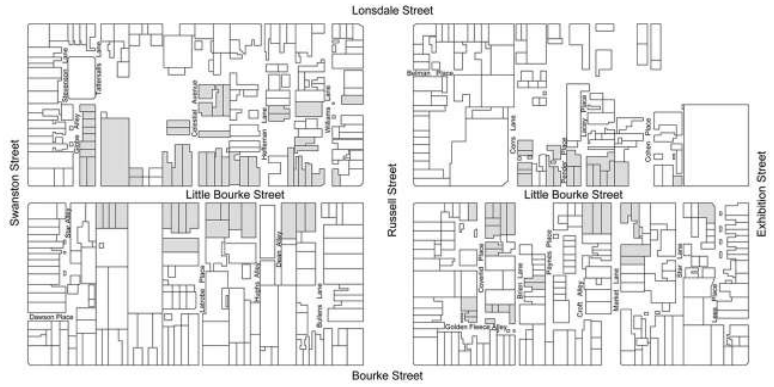
And once again, this morphological process reflects quite well the social changes that occurred at that time. After the Great Depression in the 1930s, Melbourne Chinatown had shrunk to a handful of shops (Melbourne City Council, 1985), in parallel with the considerable reduction of Chinese-born population that was a low 1,491 in 1947 (ABS, 2014). The aging of carpenters and the introduction of machinery production led to the decline of Chinese furniture making in Chinatown. The wholesale activities of fruits and vegetables by Chinese merchants there were also significantly reduced due to various protection legislations. Previous residential, manufacturing, and wholesaling functions of Melbourne Chinatown were gradually replaced by retailing and catering, reflecting the popularity of Chinese cuisine (Figure 2c). The Migration Act in 1958 repealed the previous Immigration Restriction Act and abolished the dictation test (Choi, 1975, p.60). The long-standing White Australia Policy was even removed by the Whitlam government after the victory of the Labour Party in 1972 (Anderson, 1990, p. 141), leading to a sharp increase of immigration. Melbourne Chinatown was subject to the increasing pressure for redevelopment. In June 1975, Lord Mayor R. Walker investigated the formal establishment of the Chinatown in Melbourne. The council approved the concept in September in the same year. A five-year refurbishing program was initiated as the first stage of redevelopment. To define the entrances of Melbourne Chinatown, four Chinese gateways were erected across Little Bourke Street facing Swanston Street, Russell Street, and Exhibition Street (Anderson, 1990, p.143).

Melbourne Chinatown from the 1980s to the 2010s

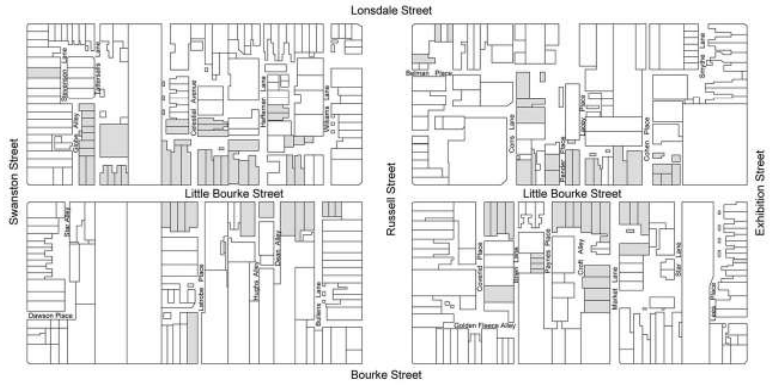
The second stage of redevelopment of Melbourne Chinatown was carried out in the 1980s, but this time, and in concordance with the ideas of empowerment and multiculturalism in vogue, the Chinese community was asked to participate actively. The Chinatown Steering Committee was established in 1982 (Wong, 1987, p.4), which was subsequently handed over to the Chinatown Historic Precinct Committee formed under the Chinatown Historic Precinct Act 1984 to oversee the ongoing development and promotion of the Chinatown (Melbourne City Council, 1985, p.7). Under the Act, changes to building facades and new development applications in Melbourne Chinatown have to be reviewed by the Committee, which can also issue directions to require owners to maintain the existing external appearance of buildings to be consistent with the character of the precinct (Anderson, 1990, p.146). In this case, existing Melbourne Chinatown is well preserved and maintained against further plot amalgamation and major property development (Figure 1d). Although there are some new hotels built in this area, such as the Punt Hill Apartment Hotel, the Hotel Grand Chancellor, and the Mantra On Russell Hotel, there have only been limited changes of urban fabric in terms of the laneway system from the 1980s to nowadays. The *Chinatown Action Plan* prepared by the Melbourne City Council and the Victorian Tourism Commission was released in 1985 (Melbourne City Council, 1985). Following the Action Plan, the Museum of Chinese Australian History was established and Cohen Place was transformed into an open plaza with the erection of a new Chinese gateway facing Little Bourke Street.

This formalisation of the Melbourne Chinatown could not have been without the profound changes that Australian society underwent in the late 1980s. The 'National Agenda for a Multicultural Australia', promulgated in 1989, not only opened the country to its existing cultural diversity, but also favoured new waves of immigration. More Chinese students and migrants have been attracted to come to Melbourne since then. The Chinese-born population was increasing again reaching 48,692 persons in 1986 and 93,347 in 2011 (ABS, 1988, 2014). Within a multicultural context, Chinese restaurants and cafes in Melbourne Chinatown flourished in numbers, offering a variety of choices to tourists and residents. Today, Melbourne Chinatown has become a famous destination for dining, ranging from gourmet restaurants to casual noodle bars and dumpling houses (Figure 2d). Many Chinese restaurants and cafes are located along narrow laneways, contributing to the characteristics of urban landscape in Melbourne. The most frequently used laneways

Figure 2. Maps showing the distribution of Chinese-related functions based on Mahlstedt Maps, Blake and Melbourne Interactive Map. a: 1880, b: 1910, c: 1975, d: 2015

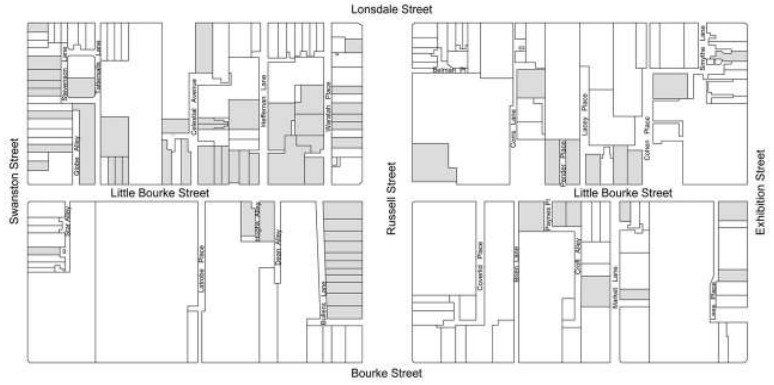


a. 1888



b. 1910

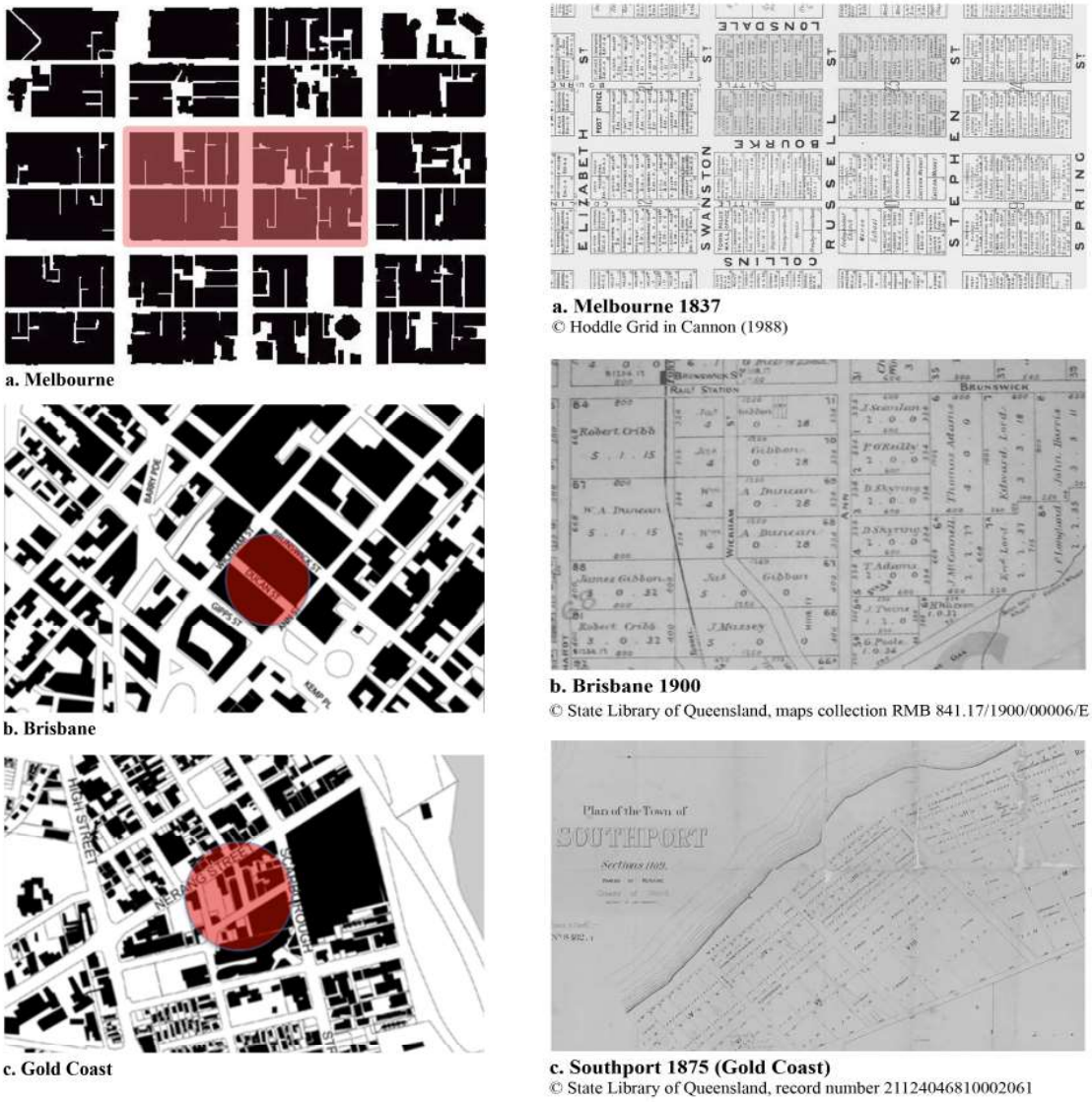
c. 1975



d. 2015

Figure 3. Locations of Chinatowns in their city precincts based on 2014 cadastral maps. a: Melbourne, b: Brisbane, c: the Gold Coast

Figure 4. Recurrent urban land division pattern. a: Melbourne 1837 © Hoddle Grid in Cannon (1988), b: Brisbane 1900 © State Library of Queensland, maps collection RMB 841.17/1900/00006/E, c: Southport 1875 (Gold Coast) © State Library of Queensland, record number 21124046810002061



are Tattersalls Lane, Heffernan Lane, and Waratah Place connecting Little Bourke Street and Lonsdale Street, as well as Market Lane connecting Little Bourke Street and Bourke Street. Compared with these north-south laneways, circulation in east-west direction still relies heavily on Little Bourke Street in this area apart from surrounding thoroughfares.

Resilience of Melbourne Chinatown

Based on the above analysis, the series of Melbourne Nolli maps from the 1880s to 2015 illustrates the burgage cycle of development in Conzen's term. After the regular land division for public auctions in the 1930s, plots were further subdivided into smaller pieces, especially during the building boom in the 1880s. In the beginning, buildings were normally located facing major thoroughfares. Within the consistent rectangular structure of

the Hoddle Grid, unplanned laneways were gradually evolved as right of ways to serve the buildings from the rear after plot division. When the land value was increased, open backyards were covered and buildings were extended in stages until the whole plots were filled in. The development process was slowed down during the Great Depression in the 1930s and was disrupted during the World Wars of 1914-18 and 1939-45. After the Wars, Melbourne CBD was under considerable pressure from private developers for urban renewal. More old buildings were demolished and smaller plots were amalgamated for redevelopment, leading to the erection of large shopping centres, hotel towers, and other building typologies. As a result, some laneways were shortened or even totally disappeared. The whole process is an organic evolution in response to political, economic, and social changes, but most surprisingly within a grid system. It certainly impacted the perimeter of Chinatown throughout its different phases, yet it might be suggested that it also contributed to maintain alive in period of disarray.

However, the weight of the Chinese community life, through its societies and associations should not be underestimated in maintaining spatial legibility and urban forms. In order to foster mutual assistance among Chinese, district associations were formed, including the Kong Chew Society in 1841, the See Yup Society in 1854, the Num Pon Soon Society in the 1850s, and the Ning Yang Society in 1909 (Mei, 2009). They played an important role among early Chinese migrants. Regular social events were organised by these associations along Little Bourke Street. These associations were also related with Chinese traditional religions of Confucianism, Buddhism, and Taoism. In parallel to the development of district associations, churches were purposely built along Little Bourke Street such as the Chinese Methodist Church in 1872, the Presbyterian Mission Church in the 1880s, and the Church of England Chinese Mission of the Epiphany in the 1890s. These churches aimed to serve Chinese migrants by conducting English classes and addressing their specific needs. These buildings rooted the community and set up a storefront that anchored further the identity of the place. Altogether, it might explain why consequently to the recognition of cultural pluralism and multiculturalism, as well as the formalisation of Melbourne Chinatown, the precinct was successfully revitalised and transformed into an ethnic precinct with a high concentration of Chinese cafes and restaurants. Today, marked on every touristic map and flagged on the social media, Chinatown precinct is one attraction to absolutely visit in Melbourne. Could this success explain the creation of Brisbane and Gold Coast Chinatowns, which respectively opened in 1987 and 2015? Could that be understood as a new vision for urban life?

Comparison of Chinatowns in Melbourne, Brisbane, and the Gold Coast

Compared with the lengthy evolution of community-based Chinese settlement in Melbourne, the Chinatowns in Brisbane and the Gold Coast have short formation history. Both of them did not emerge progressively over time. Their current locations of Fortitude Valley in Brisbane and Southport in the Gold Coast have little historical traces of early Chinese settlements (Dupre & Xu, 2014) (Figure 3). In fact, even though Brisbane shared a similar pattern of rise-decrease-rise Chinese-born population, there was never really an established Chinese settlement precinct in the city until the Second World War, when American troops favoured the emergence of exotic tastes and entertainment (Ip, 2005). Brisbane Chinatown, along Duncan Street, was formally opened in 1987 under the strong support of the local government in the context of multiculturalism, taking for legitimate an area where there were Chinese businesses, but not a long tradition of settlement per se.

Similarly on the Gold Coast, there was no ethnic territoriality to sustain the choice of the location of this newly born Chinatown (Dupre & Xu, 2015), developed as part of the revitalisation of the Gold Coast CBD in Southport. There was even less background in regard to Chinese population since the Gold Coast hosted very few Chinese immigrants until recently: Chinese-born residents represented only 0.7 % of the population of the city in 2011. This compares with 6.1 % for Melbourne and 3.1% nationwide (ABS, 2014). Therefore, the top-down approach at the origin of the Brisbane and Gold Coast Chinatowns not only questions the paradigm of the development of ethnic district, but also its often associated organicity.

However, although these three Chinatowns in Australia have different historical formation, their urban forms share some similarities. All of them were strongly influenced by the traditional colonial pattern of development with regular land division, followed by amalgamation or subdivision of plots prior to later redevelopment (Figure 4). This process is clearly identified for Duncan Street, in Brisbane, as well as for Young Street in the Gold Coast. As such, the creation of Brisbane and Gold Coast Chinatowns are done at a different stage of the burgage-cycle, but still respecting the analysed pattern of the Melbourne Chinatown's burgage-cycle. Thus, despite being either bottom-up or top-down created, they all conform to the Australian organicity in their growth and morphological features.

Nevertheless, since these two Chinatowns were developed quite recently, the analysis about the evolution of uses and functions in each site is at the moment quite limited, even impossible for the Gold Cost case. But it would be definitively interesting to address the issue in five and ten years. Yet, as of today, the survey assessing the functions in place in Melbourne, Brisbane and Gold Coast Chinatowns presents some interesting findings. As a long-time-established Chinatown, Melbourne offers nearly 59% of its businesses dedicated to restaurants, cafe and shopping. This is almost similar to the Brisbane Chinatown (almost 30 years old) with 63% for the same type of businesses, but very different from the Gold Coast case where it concerns only 12% of the businesses. Furthermore, Melbourne Chinatown is the only place to have souvenir shops (11%) (Dupre & Xu, 2015). As such, it would be helpful to investigate further on the perception of the success/attraction for each Chinatown to establish whether there is a link between their success/ attraction with the amount of restaurants, cafe and shopping and/or with the presence of souvenir shops.

Conclusion

In Melbourne Chinatown, the urban life is intrinsically correlated with the urban fabric, which has been gradually evolved under a bottom-up approach. Under ongoing plot division, a labyrinth of laneways was generated out of necessity and its configuration cultivated a sense of neighbourhood. The community-based Chinese settlement was scattered across intricate laneways. The establishment of Chinese district associations and churches along Little Bourke Street played an important role in the community of early migrants as key social institutions. Despite various changes through the decades, the whole settlement has demonstrated its resilience, similar to the adaptability of a living organism. Post-war amalgamation of plots for redevelopment has substantial impact on the former fine-grained urban texture, but under the Chinatown Historic Precinct Act 1984, historical fabric of Melbourne Chinatown is well protected and maintained. The attractiveness of the Chinatown does not rely on the erection of homogenous shopping centres and globalized high-rise buildings, but the liveliness of the streetscape. Regular street markets and cultural performances during traditional festivals, undoubtedly, can contribute to the vitality of the precinct.

Contrasting to the rich cultural heritage and organic evolution of Melbourne Chinatown, the development of Chinatowns in Brisbane and the Gold Coast was driven by a top-down model initiated by government planning forces for the sake of tourism marketing and city branding, with little history of Chinese settlements. Both of them proposed new visions for urban life, unlike the Melbourne Chinese settlements. Yet the reading of their urban morphology evidences a similar Australian organicity, which considerably questions the paradigm of ethnic district. The creation of an all-in-one Chinatown challenges our traditional representations of historical urban ethnic landscapes, but at the same time questions our resistance to new visions. Further investigations on the sense of place and the success of these new Chinatowns could contribute to assess whether these new visions are sustainable.

References

ABS (2014), Australian Bureau of Statistic (www.abs.gov.au) accessed September 2014.
Anderson, K. (1990) 'Chinatown re-oriented: A Critical Analysis of Recent Re-development Schemes of a Melbourne and Sydney Enclave', *Australian Geographical Studies* 28, no. 2, 137-154.
Andersen, K. (1991) *Vancouver's Chinatown: Racial Discourse in Canada, 1875-1980* (McGill Queen's University Press, Montreal).
Blake, A. M. T. (1975) 'Melbourne's Chinatown: The Evolution of an Inner Urban Ethnic Quarter', unpublished BA dissertation, University of Melbourne, Melbourne.
Cannon, M. and Macfarlane, I. (1988) *Historical Records of Victoria*, vol. 5 (Victorian Government Printing Office, Melbourne).
Char, T. Y. (1932) 'Legal Restrictions on Chinese in English-speaking Countries of the Pacific, I', Chinese Social and Political Science Review 16, 472-513.
Choi, C. Y. (1975) *Chinese Migration and Settlement in Australia* (Sydney University Press, Sydney).
Christiansen, F. (2003) *Chinatown, Europe: An Exploration of Overseas Chinese Identity in the 1990s* (Routledge, London).
Chuang, Y.H. and Trémon, A.C. (2013) 'Problematizing "Chinatown": Conflicts and Narratives surrounding Chinese Quarters in and around Paris', in Wong, B. and Tan, C. (eds.) *Chinatowns around the World: Gilded Ghetto, Ethnopolis, and Cultural Diaspora* (Koninklijke Brill NV, Leiden) 187-214.
Conzen, M. R. G. (1960) *Alnwick, Northumberland: A Study in Town-plan Analysis* (George Philip & Son, London).
Dupre, K. and Xu, B. (2014) 'Chinatowns in Australia: Power at stake versus Urban Responses', in AlSayyad N. (2015) Navigating multiple cultures, Traditional Dwellings and Settlements Working Paper Series, Volume 260, (IASTE, Berkeley) 66-84.
Dupre, K. and Xu, B. (2015) 'The new Gold Coast Chinatown: Stakeholders' Development Preferences'. *International Tourism Studies Association* 1, no. 2, 119-138.
Hearn, A. H. (2013) 'Chinatown Havana: One Hundred and Sixty Years below the Surface', in Wong, B. and Tan, C. (eds) *Chinatowns around the World: Gilded Ghetto, Ethnopolis, and Cultural Diaspora* (Koninklijke Brill NV, Leiden) 163-186.
Ip, D. (2005) 'Contesting Chinatown: Place-making and the Emergence of 'Ethnoburbia' in Brisbane, Australia', *GeoJournal* 64, no. 1, 63-74.
Lewis, M., Goad, P. and Mayne, A. (1994a) *Melbourne: The City's History and Development* (City of Melbourne, Melbourne).
Lewis, M. (1994b) *Melbourne: The City's History and Development*, Vol. 2: Bibliography (City of Melbourne, Melbourne).
Ma, L. J. C. and Cartier C. (2003) *The Chinese Diaspora: Space, Place, Mobility, and Identity* (Oxford: Rowman & Littlefield Publishers).
Markus, A. (1974) 'Divided we fall: the Chinese and the Melbourne Furniture Trade Union, 1870-1900', *Labour History* 26, 1-10.
McConville, C. (1985) 'Chinatown', in Davision, G., Dunstan, D. and McConville C.(eds.) The Outcasts of Melbourne: Essays in Social History (Allen & Unwin, Sydney; London; Boston) 58-68.
Mei, W. Q. (ed.) (2009) *A History of See Yup Society of Victoria Australia* (See Yup Society of Victoria, Melbourne).
Melbourne City Council (1985) *Chinatown Action Plan* (The Melbourne City Council and the Victorian Tourism Commission, Melbourne)
Office of Multicultural Affairs (1989) *National Agenda for a Multicultural Australia* (Australian Government Publishing Service, Canberra).
Palfreeman, A. C. (1967) *The Administration of the White Australia Policy* (Melbourne University Press, Melbourne).
Serle, G. (1963) *The Golden Age: A History of the Colony of Victoria, 1851-1861*. (Melbourne University Press, Melbourne).
Turner, I. A. H. (1967) 'The Growth of Melbourne: An Historical Account', in Troy, P. N. (ed.)

Urban redevelopment in Australia. (Australian National University Press, Canberra) 19-48.
Whitehand, J. W. R. (1981) 'Conzenian Ideas: Extension and Development', in Whitehand, J. W. R. (ed.) *The Urban Landscape: Historical Development and Management – Papers by M. R. G. Conzen* (Academic Press, London; New York) 127-152.
Wong, M. W. (1987) 'Meaning and Behaviour in the Built Environment: A Case Study of Melbourne's Chinatown', unpublished dissertation, University of Melbourne, Melbourne.
Wu, J. (1928/1991) *Chinatowns: Accommodation and Assimilation* (Tianjin Renmin Publishing House, Tianjin).
Yarwood, A. T. (1964) *Asian Migration to Australia: The Background to Exclusion 1896-1923* (Melbourne University Press, Melbourne).
Young, W. (1868) *Report on the Condition of the Chinese Population in Victoria* (John Ferres, Government Printer, Melbourne).

The impact of Iranian architecture parameters in the urban complex design of Shahestan Pahlavi in Tehran by Louis I. Kahn, Kenzo Tange , Arata Isozaki

Maesoomeh Arabi
Draco PhD School, "Sapienza" University of Rome, 53A, via Gramsci, 00197, Rome, Italy
Keywords: New center city,Abbasabad,Louis Kahn,Kenzo Tange,Arata Isosaki

Abstract

After the world war II, Tehran saw a rapid growth in size and population. Modern development of Tehran began in the 1930.In 1965, the social and physical structure of Tehran was divided into three main substructures; the old core, the central, and the north core. The first idea for a new urban centre was proposed by Victor Gruen- Farmanfarmaian Associtates. The new central district was to be Abbas Abad, located a few kilometres to the north of the old city. As a big project which was made possible by the oil boom in the 1973,during the reign of Mohammad Reza Shah Pahlavi, in the unique place of the hills of Abbas Abad. This location, which was called Shahestan Pahlavi, included a vast plaza to serve as "the civic heart of the nation" and governmental, financial, and residential building. It was the most potential site for both governmental and housing monumental intervention as a manifestation of modern governance of Tehran. The final plan of the project was achieved through the combination of three international famous architects Kahn, Tange, and Isosaki. The construction began in 1975, but did not continue because of the Islamic Revolution. The article intends to study the site, the specific topographic condition in the cross of main infrastructures and specific characteristics of three projects, to be a leap in order to form a better understanding of the design. The main aim of this article is to investigate the role and influence of Iranian architecture in the creation of this project and the contradiction between modernization and tradition in the old centre of Tehran and new centre.

Introduction

The end of Qajar dynasty and the beginning of the reign of Reza shah (1925-1941) could be a new period of modernization in Tehran. That was the result of some changes including: destruction and deterioration of the city's historical core. The first transformation was the extension of the city toward the north in 1950 and 1960. After the World War II, Tehran was bigger and more crowded . The first master plan of the city, was prepared by Abdol-Aziz Farmanfarmaian 's Association in Tehran and Victor Gruen Associates in Los Angeles.

In this period, the king of Iran, inaugurated the construction of a new center on the 560-Hectar site of Abbasabad between Tehran's old core and the foothill region of Shemiran. The proposed plan prepared by British firm Llewelyn-Davies International. This project was a multifunctional complex, including governmental, financial, political, administrative, cultural and etc. This big project was established by the oil boom in the 1973, during the reign of Mohammad Reza shah Pahlavi which was called Shahestan Pahlavi.

In October 1973, the royal government of Iran asked two architects, Louis I. Kahn and Kenzo Tange , to propose a design for the new centre of Tehran in Abbas Abad Hills. In October of 1973, the American architect Louis Kahn (1902-1974) was approached to prepare a plan, in association with the Japanese architect Kenzo Tange ,for an urban center in Abbasabad district of Tehran, a project that was to become his last architectural venture. His engagement with Tehran project lasted for less than six months, from October 1973 until March 1974, until his heart stopped beating in New York's Pennsylvania Railroad station. He had died before arranging his joint effort with Tange. A few sketches and a clay model of the project all remained in Kahn's archive. Later , Arata Isosaki arrived in Tehran to collaborate with Tange. The construction which was begun in 1975, was not continued because of the Islamic Revolution. The article intends to study the site and specific characteristics of three projects. The main aim of this article is to investigate the role and influence of Iranian architecture on the creation of this project and the relationship between modernization and tradition in the old center and new center.

Methodology

Historical research is the method used in this article. So topics were bringing together through data collection, evaluation and verify this information, combination of reasons and analyze them and finally lead to conclusion. In this article also used of library studies and the documents in Kahn's archive at the University of Pennsylvania for the contextual analysis. For evaluation, in first analyzed three plans that designed by Kahn, Tange and Isosaki. Then tried to bring Kahn's perceptions from Iranian architectural culture and political context in the 1973.In this investigation also tried to discover the relationship that Tange created between the old center and north part of Tehran. Finally, to achieving conclusion, assessment combination two project for present final project.

Tehran 's history

Until the late nineteenth century, Tehran was a small town and located at the slopes of Alborz Mountains. The original walls of the city were built by the order of Safavid Shah Tahmasb in 1553.Tehran became the capital in 1789 by the order of Agha Muhammad khan Qajar and was enlarged by octagonal walls. Qajar dynasty (1772-1925) built several summer palaces in the foothill region overlooking the city(Shemiran).The main road connecting the city to Shemiran was old Shemiran Road. The story of modern city began with demolition of Nasseri walls and gates in the 1930 during Pahlavi dynasty . The urban transformation of Tehran was an integral part of the reforms promoted by the state of Reza Shah, which was aimed to create a homogenous, secular and modern nation-state out of the multi-ethnic territories that had inherited from Qajar dynasty. The urban growth was targeted towards Shemiran: a foothill region stretching to the south of Alborz Mountains which was five kilometers from north of the old core of the city. In 1967 Shah's family left Marmar Palace of the old core in order to live in Niavaran Palace in Shemiran. The

north-south connection built by the construction of a new street (Pahlavi Road)-running parallel to the east of the old Road. After this expansion in 1965 Abdolaziz Farmanfarmaian and Victor Gruen prepared a 25- year growth plan for Tehran. They have two conceptual developments , including linear and central development concepts which is consisted of ten new urban cities . (The final proposal is an east-west linear growth). In the overall scheme of them, Abbas Abad has a prominent position ;it was not only the center of one of the ten proposed urbans, but also located at the intersection of the two main axes of the city: north-south axis, comprising three nodes Shemiran, Abbasabad and the old city center, and the proposed east-west axis along which the future growth of the city was envisioned. The site was a 554-hectar land that was called Shahestan Pahlavi, included a vast plaza and governmental, financial and Residential building. It was the most potential site for both governmental and housing monumental intervention as a manifestation of modern governance of Tehran.

Louis Kahn

In October 1973, when Louis Kahn was contacted regarding the design of an urban center in Tehran, the National Assembly at Dhaka was in the final stages of its construction and the Indian Institute of Management was just recently completed. He had two proposals for the new center. Kahn chose Nader Ardalan as his assistant and coordinator of local efforts for the project. Among Kahn's archives there are the remains of a few sketches and a clay model from the project. Kahn's sketch of Tehran shows his impression of the city. In this sketch, we can see the northern region (Shemiran), the southern periphery, the two royal palaces of Shemiran, and the two old north-south roads. The emphasis on northern Tehran and its southern periphery are barely visible. His proposal for Abbasabad was based on the master plan of Tehran proposed by Gruen-Farmanfarmaian.

-The first proposal

In the first proposal, the site was divided by the east-west highway. The complex was limited to the irregularly bounded flat land situated on the south of the hills and the hilly northern was remained intact as a natural park. Everything was arranged around two plazas: a rectangular square and an oval square.

The oval square which is in the shape of St Peter's Square at Vatican is connected to a rectangular square following the exact proportions of Naghshe Jahan meydan in Isfahan[1]. The rectangular urban plaza surrounded by colonnades and a triangular area covered with square blocks arranged in a checkerboard pattern were the main elements of the first proposal. The commercial and business activities were situated in the heart of the complex. The governmental buildings were aligned in two rows in the southern side of plaza. Other functions, including a stadium and mosque were situated on the western part. The inclusion of a mosque in the building program of the civic center also signals a new approach to the Islamic tradition. Among the documents kept in the archive, there are some plans of several historical monuments, including Isfahan and its Safavid square, Persepolis, Saint Peter plaza in Vatican City and Piazza San Marco in Venice. Sketches also show Kahn's attempt to connect the plaza to the business district, settled finally on an oval-shaped space, clearly modeled on Saint Peter plaza . This spatial separation between the checkerboard part to the north and the rest of the complex—emphasized by the pond and oval plaza—appears to have been conceptual rather than functional. The monumental expression on a large scale through a checkerboard configuration appears to be the main theme of the design. Kahn's sketches for Abbasabad show several typical features of his former designs. Just as his scheme for the National Center in Dhaka where a large pond unifies freestanding structures, water plays an important role in the early sketches of Abbasabad. This emphasis on water is particularly evident in a sketch in which the pond stretches along the main north-south valley within the hills.

[1]The examples of St Peter's, St Mark's and Naqsh-e Jahan squares were among the documents in Kahn's archive for the Abbas Abad project.

-The second proposal

In the notes of the second proposal, Kahn described the plaza as "the place of civic and national meeting in regard to the way of life"[2]. In the notes, Kahn also referred to Palazzo dei Congressi , his unrealized design for a bridge-shaped city hall in Venice. The reference to the Venice city hall indicates Kahn's belief in a relatively more democratic way of life and also this is evident in his previous projects. Kahn extended the city center northward in a linear strand: the large plaza and the stadium were relocated to the center of the hilly part of the site, and the business district formed a diamond shape. By moving the plaza to the hills, it became disconnected from the urban fabric of the city, like an acropolis, an idea perhaps more attuned to the Shah's vision of an urban center .Kahn's sketch plan of the second scheme suggests that he had grouped the functions in two clusters: the first one, organized around the plaza, included the opera philharmonic, city hall and inter-nation symposium among other functions. The diamond-shaped southern part, which Kahn further developed in a separate sketch, was intended to house art galleries of merchants, the rug symposium, wall streets, bourse, stock exchange and the world bank. The diamond-shaped part was the core Kahn's concept of Abbasabad to create the sense of the place. In its cross axial arrangement one can discern an allusion to the chaharbagh (quadripartite) layout of traditional gardens. Kahn's sketch of the second scheme. With the extension of the site to the hills, Kahn gave a more perfect shape to his design for the core area of the complex. The diamond-shaped cluster of square buildings is bisected by the rapid transit route (running in north-south direction), and an east-west highway, forming a cross axial form which might allude to the chaharbagh layout of Persian gardens.

Kenzo Tange

Tange's concept was very different from Kahn's proposal. He used an expressionistic language in his work. Instead of an east-west division of the site, he proposed a big linear mega structure to connect the old urban center to the north center. It consisted, cylindrical towers at its beginning and in the south , the zone contained the various office and governmental building. The cultural area contained a mosque, museum, theatre and memorial hall consisted in the dome. A central plaza acted as the mediator in harmonizing the government and office buildings with the natural topography. This urban axis was supported by a series of east–west bridging blocks, with the highways running on top and apartment buildings on the lower level to house the functions requested for the new centre. Cylindrical high-rise office buildings punctuated the design both along the main axis and at the site's edges, offering a contrast to the lower slab buildings and symbolizing the new urban centre[3].

Final project

In February, the architects met in Tehran, and each presented their work to the imperial family. The result was quite predictable. Kahn used the very formal language of his work and was more in line with the King's vision, presented a minimalistic composition but, Tange's proposal met the Queen's expectations, but it was far from the King's idea of an imperial urban centre.

This was not the end of the story, this time Arata Isozaki was arrived in Tehran and developed the initial sketch the following month, and another meeting was planned for the late April ,so that Kahn, Tange and Isozaki could finalize the collaborative parts of the project. As a result of several days of discussion, a sketch was made based on the aspects of Kahn's and Tange's plans in common:

[2]Nader Ardalan, letter to Louis Kahn, 27 February 1973; transcribed in Emami, "Civic Visions, National Politics, and International Designs".

[3]Abbas Abad new city center, "The Work of Kenzo Tange & URTEC during the 70's", Japan Architect 51, nos. 8/9, special issue (August– September 1976), 104–9.

To leave the beautiful topography , to express clearly in the structure the district's nature as a new urban centre at the junction of the north–south and east–west axes of Tehran, to create a central plaza that could serve as a cultural centre symbolizing Iran's 2,500 years of imperial history, to place the apartment buildings around the central district and to use both skyscrapers and slabs ,to give the central plaza like Isfahan and to create an urban silhouette recalling that of Persepolis and to employ colonnades.

Tange agreed to proceed on the basis of Kahn's sketch. One inevitable result of the discussion was the extension of the project into the hilly landscape, although the architects tried to keep the natural beauty of the site as much as they could. The large plaza and the sports stadium were relocated to the centre of the hilly part of the site, and the business district took on a diamond-shaped pattern found in other projects Kahn had designed prior to the city centre of Abbasabad.

Conclusion

In a period when urban planning was new in Iran, Shahestan Pahlavi was a project for a modern city centre with a global scale. The master plan of Tehran presents the first attempt to plan the Abbasabad site, while the hilly part of the site was designed to house a modern neighborhood, the southern flatter lands were reserved for the district's urban center. This was Kahn's last project as he died 6 months after the beginning of the project. Although the best in expressing his design concepts of monumentalize, spirituality and new international style, this project has attracted the least attention among his oriental projects in India, Pakistan and etc. In Abbasabad project he has purposefully used some historical references such as Isfahan 's square , Persepolis and Venice's San Marco Piazza.

Instead, Tange adopted an expressionistic approach in his proposal. The last plan was based on the master plan, and both architects decided to expand the city center from the limited area of the southern valley plaints to the northern hills. Terms of their joint venture was not clear at the time of Kahn's death , but Tange had agreed to work on Kahn's initial sketches. The final project was designed by collaboration of Arata Isosaki and one of the main principals of this proposal was preserving the natural assets of its site, including the natural topography and the view of Alborz mountain. The construction was soon halted with the revolution of 1978-79, which ultimately replaced the Pahlavi monarchy with the Islamic Republic.

References

ABS (2014), Australian Bureau of Statistic (www.abs.gov.au) accessed September 2014.
Anderson, K. (1990) 'Chinatown re-oriented: A Critical Analysis of Recent Re-development Schemes of a Melbourne and Sydney Enclave', *Australian Geographical Studies* 28, no. 2, 137-154.
Andersen, K. (1991) *Vancouver's Chinatown: Racial Discourse in Canada, 1875-1980* (McGill Queen's University Press, Montreal).
Blake, A. M. T. (1975) 'Melbourne's Chinatown: The Evolution of an Inner Urban Ethnic Quarter', unpublished BA dissertation, University of Melbourne, Melbourne.
Cannon, M. and Macfarlane, I. (1988) *Historical Records of Victoria*, vol. 5 (Victorian Government Printing Office, Melbourne).
Char, T. Y. (1932) 'Legal Restrictions on Chinese in English-speaking Countries of the Pacific, I', Chinese Social and Political Science Review 16, 472-513.
Choi, C. Y. (1975) *Chinese Migration and Settlement in Australia* (Sydney University Press, Sydney).
Christiansen, F. (2003) *Chinatown, Europe: An Exploration of Overseas Chinese Identity in the 1990s* (Routledge, London).
Chuang, Y.H. and Trémon, A.C. (2013) 'Problematizing "Chinatown": Conflicts and Narratives surrounding Chinese Quarters in and around Paris', in Wong, B. and Tan, C. (eds.) *Chi-*

natowns around the World: Gilded Ghetto, Ethnopolis, and Cultural Diaspora (Koninklijke Brill NV, Leiden) 187-214.
Conzen, M. R. G. (1960) *Alnwick, Northumberland: A Study in Town-plan Analysis* (George Philip & Son, London).
Dupre, K. and Xu, B. (2014) 'Chinatowns in Australia: Power at stake versus Urban Responses', in AlSayyad N. (2015) Navigating multiple cultures, Traditional Dwellings and Settlements Working Paper Series, Volume 260, (IASTE, Berkeley) 66-84.
Dupre, K. and Xu, B. (2015) 'The new Gold Coast Chinatown: Stakeholders' Development Preferences'. *International Tourism Studies Association* 1, no. 2, 119-138.
Hearn, A. H. (2013) 'Chinatown Havana: One Hundred and Sixty Years below the Surface', in Wong, B. and Tan, C. (eds) *Chinatowns around the World: Gilded Ghetto, Ethnopolis, and Cultural Diaspora* (Koninklijke Brill NV, Leiden) 163-186.
Ip, D. (2005) 'Contesting Chinatown: Place-making and the Emergence of 'Ethnoburbia' in Brisbane, Australia', *GeoJournal* 64, no. 1, 63-74.
Lewis, M., Goad, P. and Mayne, A. (1994a) *Melbourne: The City's History and Development* (City of Melbourne, Melbourne).
Lewis, M. (1994b) *Melbourne: The City's History and Development*, Vol. 2: Bibliography (City of Melbourne, Melbourne).
Ma, L. J. C. and Cartier C. (2003) *The Chinese Diaspora: Space, Place, Mobility, and Identity* (Oxford: Rowman & Littlefield Publishers).
Markus, A. (1974) 'Divided we fall: the Chinese and the Melbourne Furniture Trade Union, 1870-1900', *Labour History* 26, 1-10.
McConville, C. (1985) 'Chinatown', in Davision, G., Dunstan, D. and McConville C.(eds.) The Outcasts of Melbourne: Essays in Social History (Allen & Unwin, Sydney; London; Boston) 58-68.
Mei, W. Q. (ed.) (2009) *A History of See Yup Society of Victoria Australia* (See Yup Society of Victoria, Melbourne).
Melbourne City Council (1985) *Chinatown Action Plan* (The Melbourne City Council and the Victorian Tourism Commission, Melbourne)
Office of Multicultural Affairs (1989) *National Agenda for a Multicultural Australia* (Australian Government Publishing Service, Canberra).
Palfreeman, A. C. (1967) *The Administration of the White Australia Policy* (Melbourne University Press, Melbourne).
Serle, G. (1963) *The Golden Age: A History of the Colony of Victoria, 1851-1861*. (Melbourne University Press, Melbourne).
Turner, I. A. H. (1967) 'The Growth of Melbourne: An Historical Account', in Troy, P. N. (ed.) *Urban redevelopment in Australia*. (Australian National University Press, Canberra) 19-48.
Whitehand, J. W. R. (1981) 'Conzenian Ideas: Extension and Development', in Whitehand, J. W. R. (ed.) *The Urban Landscape: Historical Development and Management – Papers by M. R. G. Conzen* (Academic Press, London; New York) 127-152.
Wong, M. W. (1987) 'Meaning and Behaviour in the Built Environment: A Case Study of Melbourne's Chinatown', unpublished dissertation, University of Melbourne, Melbourne.
Wu, J. (1928/1991) *Chinatowns: Accommodation and Assimilation* (Tianjin Renmin Publishing House, Tianjin).
Yarwood, A. T. (1964) *Asian Migration to Australia: The Background to Exclusion 1896-1923* (Melbourne University Press, Melbourne).
Young, W. (1868) *Report on the Condition of the Chinese Population in Victoria* (John Ferres, Government Printer, Melbourne).

Urban morphology and land values in central Izmir, Turkey

Ayşe Sema Kubat, Emine Duygu Kahraman
Faculty of Architecture, Istanbul Technical University, Taskisla, 34437, Taksim-İstanbul, Turkey
Faculty of Architecture, Dokuz Eylül University, Doğuş Caddesi , No: 209, Pk: 35160 Buca-Izmir, Turkey
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Abstract

Research into urban land values is commonly conducted on residential areas by evaluating the effects of different spatial parameters on land values. One of the most effective factors is the distance of the CBD from residential areas, but there remain questions regarding the land values inside the CBD itself. Are land values in the CBD homogenous? If they are heterogeneous in the CBD, what is the reason for this? This study focuses on the relationship between urban land values and morphological parameters in the CBD, and is based on Conzen's town plan analysis components; street, plot and building. These components were spatially analyzed according to their configuration, metric and type, and quantitative data for street configuration was obtained by using space syntax methodology; segment analysis of a road-centre lines map. Configurational parameters (global integration Rn), metric parameters (road width, road length, pavement width, average parcel size, average building size and building height) and type parameters (road type; street, avenue, boulevard and building type; detached, attached) have been determined as the morphological parameters for the sample streets (63) under examination in the CBD of Izmir, a coastal city in Turkey. According to the statistical analysis, road type (street) and road width have a stronger bearing on urban land values than other parameters acting within the CBD. By investigating the correlation among morphologic parameters and land values in the CBD, this study is expected to contribute to further studies in city planning and design of new centers.

Introduction

Urban land value and urban morphology studies were integrated to allow researchers to offer a new perspective for urban economy studies by using methods from both disciplines. According to Xiao (2013), since morphology influences accessibility, morphology has become an important base for analyzing urban economic structures.

Urban land values in residential areas have been analyzed according to the parameter of distance to city centers in many studies such as Alonso's (1964) model which was the one of the first. In the polycentric urban age, new centers and neighborhoods have emerged through improvements in technology and communication. Thus, the parameter of distance to the city center is not always the primary factor influencing urban land values. In addition to these developments, the central business district (CBD) in metropolitan areas often contains many management, business, commerce, service, leisure and entertainment facilities (Kubat, 1985).

Land value distribution has become more irregular in the latest city developments. While researchers conducting studies into the reasons for this new irregular economic structure, urban morphology supplied a wide range of areas to fill this gap in the spatial base. Various concepts and analyses have been developed by scientists in the field of urban morphology.

Configuration is directly related with urban morphology, and is provided by both the second and third dimensional elements of urban systems (Günay, 2006). According to Moudon (1997), all open spaces and enclosed areas are elements of urban morphology in urban systems. Buildings, streets, plots and parks are the key elements of any urban morphology analysis. As Whitehand (2007) stated in his study about Conzenian urban morphology, Conzen (1960) dealt with urban form in three sections; ground plan (site, street, plot, building plans), urban fabric (3rd dimension) and utilization of land or buildings.

In the past, studies on land values and urban morphology were performed according to morphological elements. Plot size, building base area, plot length and plot façade width were investigated in terms of their effect on land values by Kok, monkkonen and Quigley (2011). Topçu (2008) and Yomralıoğlu and Nişancı (2004) researched the effects of street morphology on land values by including elements such as; building order (attached or detached), street width, pavement width, street trees, façade, colour, rhythm, car parks, landscape level, visibility and the viability of the street.

In addition to Conzen's trilogy, in the 1980's, Hillier and Hanson's research into space syntax methodology gave a quantitative analysis basis to the field of urban morphology. This methodology gives a comparable and objective analysis of the morphological structure of cities. In the background of this methodology, pedestrian movement becomes the main issue and movement flow in urban open spaces such as streets, parks, squares is

Figure 1. CBD of Izmir (left) and study area selected from the CBD (right)

analyzed. With regard to the investigation of movement patterns, space syntax also provides information into the social and economic life practices in settlements. Researchers investigating urban land values also applied space syntax methodology to better understand the relationship between urban morphology and land values. Enström and Netzell (2007), Topçu (2008), Topçu and Kubat (2009), Gündoğdu and Çıracı (2007), Lee and Kim (2009), Saeid (2011), and Narvaez et al. (2012) conducted both axial and segment analyses and obtained quantitative configuration data such as local integration values, global integration values, connectivity rates, global choice and mean depth. In order to measure the effects of various factors on land values, statistical analyses were applied. According to the results of these statistical analyses (correlations and regressions), space syntax parameters have been found to have an effect on land values.

Cities not only have irregular economic structures in terms of land values at the macro scale, but also some land-use zones such as CBD's may have an irregular structure at the micro scale. Are the land values homogenous for every street segment of the inner CBD? The aim of this study is to reveal different land values in the CBD by evaluating it from the morphological point of view. For this purpose, this study will examine the relationship between land values and morphological characteristics of the CBD by employing both metric and typical topological perspectives.

Methodology

As a study area, İzmir which is one of the coastal cities of Turkey was selected, and the morphology of its central business district was studied. İzmir's CBD was selected because of its land value intervals. The CBD boundaries and commercial zones can be seen in the 1/25000 master plan (Figure 1 - left). The study area, Alsancak, was selected from the CBD (Figure 1 - right).

In order to determine which morphological parameter is the most influential on land values in CBDs, the study was predicated on two data types: morphological and economic.

Firstly, Conzen's (1960) town plan analyzed elements that Moudon (1997) later emphasized as basic form principles, and which are used as a base structure to categorize spatial data. As grouped by Conzen (1960), street, building and plot data was collected according to their typical, metric and configurational features by using different morphological analysis methods (Table 1). Land surveys were conducted to obtain typical and metric features, and Hillier's (1980) space syntax analysis was applied to obtain configurational features.

Secondly, land value data was collected as tax values to better understand the spatial economic structure of the CBD. Tax values from the website: "*minimum criteria for urban and rural land values per square meter*" dated July 2014 were used as proxy. As can be seen in Figure 4, tax values were mapped by using the ArcGIS programme. In the study area, 7 intervals were determined and 9 streets were selected from the same interval by using the stratified randomized sampling method to obtain the sample size; 63.

	type parameters	metric parameters	configurational parameters
Street	✓ street ✓ avenue ✓ boulevard	✓ road width ✓ pavement width	✓ integration ✓ choice
Building	✓ detached ✓ attached	✓ building height ✓ average building size	
Plot		✓ average parcel size	

Table 1. Morphological features

Table 2. Stratified random sampling of tax values (TL=Turkish lira)

Classification	Values	Number of streets
1	801-1314 TL	9
2	1315-1902 TL	9
3	1903-2533 TL	9
4	2534-3133 TL	9
5	3134-4333 TL	9
6	4333-5531 TL	9
7	5532-7626 TL	9

In study area, Kıbrıs Şehitleri avenue is the only pedestrianized avenue in the study area. In addition, the land survey shows several large boulevards for vehicular movement (Figure 2).

Finally, to analyze the relationship between tax values and morphological parameters, a statistical analysis was conducted (correlation analysis) by using an SPSS programme to evaluate the quantitative type, metric and configurational features of the CBD.

Space Syntax Analysis

The DEPTHMAPX programme was applied to conduct to obtain the configurational parameters of the space syntax methodology. Road center lines were used for the angular segment analysis(ASA) and global integration (Figure 3), and global choice values were obtained up to an 8km radius across the whole city map.

As can be seen in Figure 4, while the coastal side of the study area has the same character in terms of tax values, global integration values are not entirely parallel to tax values because of the background issue of the angular segment analysis of the minimum angular turn of segments across the whole city.

Descriptive Analysis

According to Table 3, the parameters of road type parameters (road_type_street, road_type_avenue, road_type_boulevard) and building type parameters (build_type_ detached and build_type_attached) vary between 0(do not exist) and 1(exist). For instance, if the road_type_street parameter has a value of 1, this road is a street. Of the roads within the selected sample; 67% are streets, 20% are avenues and 16% are boulevards. Moreover, within the inner CBD, 76% of the buildings are of the detached type while 24% are of the attached type.

Building heights (build_height) vary between 6 and 9 floors, with a mean of 6.05. Pavement widths (pavement_width) vary between 0m and 20m, with a mean of 3.56m. Road widths (road_width) vary between 5m and 40m, with a mean of 14.02m. Pavement widths (pavement_width) vary between 0m and 20m, with a mean of 3.56m. Average parcel sizes (aver_parcel_size) vary between 95m2 and 6454m2, with a mean of 1371.180m2. Average building sizes (aver_ building _size) vary between 985m2 and 5705m2, with a mean of 801.586m2.

Global choice value (choice_Rn) varies between 3 and 674028610, with a mean of 35259825.21. global integration value (integration_Rn) varies between 7059 and 10093, with a mean of 10093.

Correlation analysis

The correlation analysis was performed by using configurational parameters, metric parameters and type parameters.

According to the correlation results, metric parameters (road width, road length,

pavement width, average building size and building height) and type parameters (road type; street, avenue, boulevard) were found to have a significance level of 0.01. With the exception of the road type; street parameter, all the other parameters had a positive relationship with land values ($p<0.01$).

The average parcel size was found to have a significance level of 0.05. It had a positive relationship with land value ($p<0.05$).

The configuration parameter (global integration Rn), and building type parameters (detached, attached) were not found to be statistically significant ($p<0.01$, $p<0.05$).

Conclusion

This study examines the relationship between the morphological features and tax values in the CBD of İzmir. In order to determine this relationship, data was collected according to Conzen's (1960) town plan analysis elements (street, building and plot) by conducting land surveys and by using the morphological analysis method of space syntax. To evaluate the relationship between these parameters and land values, both statistical and correlation analyses were applied.

According to the correlation analysis of land values (tax values) and accessibility measures, in CBDs, the global choice value was found to be significant and related to

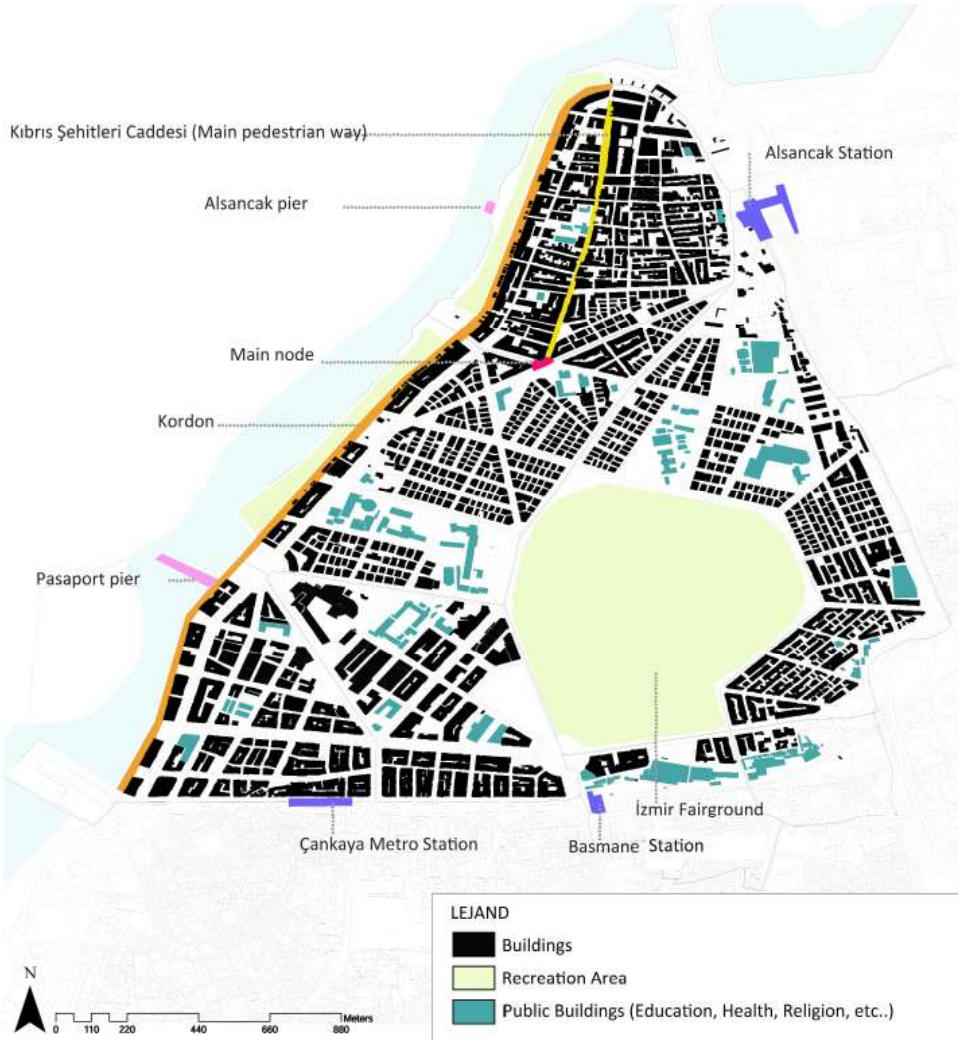
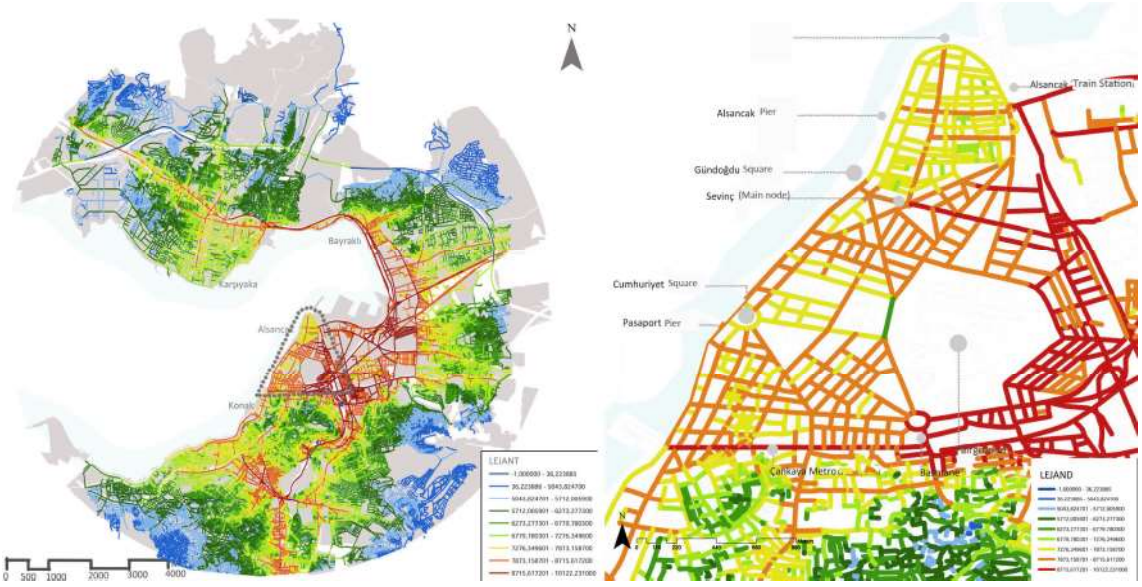


Figure 2. Building structure of study area

Figure 3. Global integration analysis and global integration analysis with the CBD boundaries map



land values (p<0.1), on the other hand, the integration value was not found to be significant. It can be said that in city centers, movement flow is more related to land values than the integration of segments because the centers are more dynamic when they are compared to residential areas. In other words, street configuration was found to be related with choice, but this was overcome by the influence of road width (metric parameter) and road type; street (type parameter) (p<0.01).

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Road type; street displays the highest negative correlation with a value of -0.717 (p<0.01). If the type of road is a street we discovered that the tax values were lower compared to avenues and boulevards, as is expected in CBDs. On the other hand, avenues are more determinative on tax values than boulevards for future predictions, which is an unexpect-

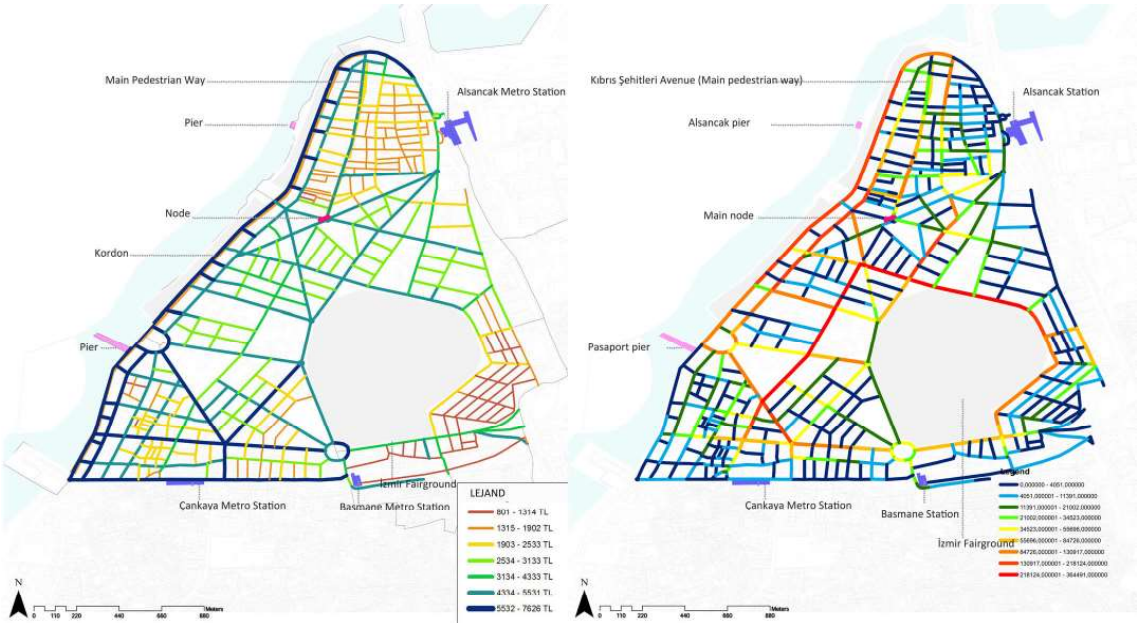

Figure 4. Land values (left) and global choice values (right)

Table 3. Descriptive statistics of the variables (n=63).

Measures	Minimum	Maximum	Mean	Standard Deviation
tax_values*	874	7626	3442,00	1949,286
road_type_street	0	1	0,67	0,475
road_type_avenue	0	1	0,20	0,403
road_type_boulevard	0	1	0,16	0,366
build_type_detached	0	1	0,76	0,429
build_type_attached	0	1	0,24	0,429
build_height	3	9	6,05	1,835
pavement_width (m)	0	20	3,56	4,561
road_width (m)	5	40	14,02	8,111
aver_parcel_size (m^2)	95	6454	728,98	1371,180
aver_building_size (m^2)	85	5705	477,32	801,586
integration_Rn	7059	10093	8224,66	10093
Choice_Rn	3	674028610	35259825,21	137714130,440

*: Dependent Variable (TL)

Table 4. Correlation analysis of morphological parameters with tax values.

Morphological Parameters	Pearson Correlation	Sig. (2- tailed)	N
road_type_street	-0,751**	0,000	63
road_type_avenue	0,589**	0,000	63
road_type_boulevard	0,351**	0,005	63
build_type_detached	0,009	0,942	63
build_type_attached	-0,009	0,942	63
build_height (m)	0,601**	0,000	63
pavement_width (m)	0,568**	0,000	63
road_width (m)	0,717**	0,000	63
aver_parcel_size (m^2)	0,262*	0,040	63
aver_building_size (m^2)	0,362**	0,004	63
integration_Rn	0,198	0,120	63
Choice_Rn	0,229	0,071	63

***. Correlation is significant at the 0.1 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

ed result. It can be said that in CBDs, pedestrian movement should be more related to the commercial facilities on avenues, rather than to the vehicular movement on boulevards. Road width has the second highest positive correlation with a value of 0.717 ($p<0.01$). In other words, if the road width is wider, tax values are also higher, as is expected.

This study shows the correlations between the morphological elements of CBDs and between 12 parameters, and finds that road type; street and road width have the highest correlations with tax values ($p<0.01$). In terms of an evaluation according to parameter headings, type and metric features are more correlated than configurational parameters in CBDs. Moreover, an evaluation in terms of Conzen's (1960) town plan analysis elements of street, building and plot, street is more correlated than buildings or plots in CBDs.

Acknowledgements

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References

Conzen, M. (1960) Alnwick Northumberland: a study in town-plan analysis. London: Institute of British Geographers.
Enström, R., Netzell, O. (2007) Can Space Syntax Help Us in Understanding the Intraurban Office Rent Pattern? Accessiblity and Rents in Downtown Stockholm, *Journal of Real Estate Finance and Economics*, Vol. 36, No. 3.
Günay, B. (2006) Şehircilik-Planlama-Tasarlama-Mimarlık-Peyzaj, Planlama Dergisi, Sayı. 4, (Sf.19-22).
Gündoğdu, M., Çıracı, H., (2007) The Relation Between Integration Values And Land Values From Spatial Configuration Characteristics: The Galata-Pera Example, In: Kubat, A. S., Ertekin, Ö., Güney, Y.I. and Eyübolou,E. (eds.), *Proceedings of the Sixth International Space Syntax Symposium*, Istanbul:ITU Faculty ofArchitecture.
Hillier, B., Hanson, J. (1984) The Social Logic of Space, Cambridge University Press, Cambridge.
Kahraman, E. D. (2015) Merkezi İş Alanlarında Kentsel Morfoloji ve Arsa Değerleri: İzmir Örneği, Yüksek Lisans Tezi, İTU, Fen Bilimleri Enstitüsü, İstanbul
Karakayacı, Ö., Karakayacı, Z. (2012) Kentsel Saçaklanma Alanlarında Arsa/Arsa Değerini Belirlemeye Yönelik Yöntem Önerisi, *The Journal of Academic Social Science Studies*, vol. 5(4), p. 107-120.
Kok, N., Monkkonen, P. ve Quigley, J. M. (2011) Economic Geography, Jobs, and Regulations: The Value of Land and Housing," AREUEA Meetings Denver.
Kubat, A. S. (1985) Türkiye'de Şehirleşme Sürecinde Şehir Merkezi Ve Merkezi İş Alanlarının Gelişmesine Yönelik Bir Araştırma (Bir Plan Bölge İçinde Örnekleme), Doktora Tezi, İ.T.Ü Sosyal Bilimler Enstitüsü, İstanbul
Lee, I., and Kim, Y. (2009) The Efect of Spatial Configuration and Land Use Pattern on Land Price Formation, In: Koch, D., Marcus, L. and Steen, J. (eds.), *Proceedings of the Seventh International Space Syntax Symposium*, Stockholm, Sweden, p.63:1-12.
Moudon, A. V. (1997) Urban Morpholgy as an emerging interdisciplinary field, Urban Morphology, Sayı.1, (Sf. 3-10).
Narvaez, L., Penn, A., and Grıffıths, S. (2012) Space Syntax Economıcs: decoding accessibility using property value and housing price in Cardiff, Wales, In: Greene, M., Reyes, J. and Castro, A. (eds.), *Proceedings of the Eighth International Space Syntax Symposium*, Santiago de Chile: PUC, 8162:1-19
Saeid, A. (2011) Space Syntax as a Tool to Assess Land Value, Innovative Land And Property Taxation, Ed. Remy Sietchiping, ISBN Number (Volume): 978-92-1-132407-5, UN-HABITAT, chp.12, p.172-191.
Topçu, M. (2008) Konut Değerleri Değişiminin Kentsel Etmenlerle Ölçülmesine Yönelik Bir Yöntem Denemesi: İstanbul Örneği, Doktora Tezi, İTU, Fen Bilimleri Enstitüsü, İstanbul
Turner, A. (2007) From axial to road-centre lines: A new representation for space syntax and a new denklem of route choice for transport network analysis. *Environment and Planning B: Planning and Design* vol. 34(3), p. 539-555.
Yomralıoğlu, T., Nişancı, R. (2004) Nominal Asset Land Valuation Technique by GIS, FIG Working Week, Athens, Greece, p.1-9.
Varoudis T. (2012) 'depthmapX Multi-Platform Spatial Network Analysis Software', Version 0.30 OpenSource,http://varoudis.github.io/depthmapX/
Xiao, Y. (2012) Urban Morphology and Housing Market, Doktora Tezi, University of Cardiff, Galler Whitehand, J. (2007) Conzenian urban morphology and urban landscapes. In Proceedings of the 6th International Space Syntax Symposium, ed. A. Kubat, O. Ertekin, Y. Guney, and E. Eyuboglu, Istanbul: Istanbul Technical University.
Minimum criteria for urban and rural land values per square meter, 2014 date: 14.09.2014, http://www.gib.gov.tr

Changes in the urban morphology of Monteruscello

Federica Visconti
DiARC_Department of Architecture, Università degli Studi di Napoli "Federico II", Naples, Italy
Keywords: Monteruscello, idea of city, urban regeneration

Abstract

Monteruscello is a "foundation city" and was built, under a contract between Ministry of Civil Protection and the Faculty of Architecture of the University of Naples, for 20.000 displaced inhabitants resettlement after the bradyseism that hit the Phlegraean area in the 80s of the last century. The project, developed by the university under the coordination of Agostino Renna, could be interpreted as an "analogous city": the urban plan shows, in a evident way, a composition based on more than one "idea of city" (with explicit references to Priene and the Goldstein siedlung by Ernst May while a kind of countryside-city with isolated houses, derived from Renna's studies for Abruzzo, is in the central part of the city). These ideas of morphologies distinguish the urban parts in relationship with their meanings (that are referred to an artificially but necessarily built history of the city: the historical centre, the first belt, the commercial city etc.) and the geography (the upper area, the area opened to the valley etc.). After thirty years from its building, Monteruscello is waiting for new transformations either because the project was not completed (particularly in the part of public spaces and buildings) or because the main part of the residential buildings (built according to the popular housing standard) are today unsuitable to the contemporary life. During a recent Workshop in the University of Naples, some of these themes were designed and the workshop results are, at the same time, reading of urban morphology, recognition of its values but also its necessary and contemporary interpretation.

Introduction

Monteruscello is a "foundation city" and was built, under contract between Ministry of Civil Protection and the Faculty of Architecture of the University of Naples, for 20.000 displaced inhabitants to be resettled after the bradyseism that hit the Phlegraean area in the 1980s. The project, developed by the university and coordinated by Agostino Renna, could be interpreted as an "analogous city": the urban plan shows, in a evident way, a composition based on more than one "idea of city" (with explicit references to Priene and the XIX century's city around the railway station while a kind of countryside-city with isolated houses, derived from Renna's studies for Abruzzo, is in the central part of the city). These ideas of morphologies distinguish the urban parts in relationship with their meaning (that are referred to an artificially but necessarily built history of the city: the historical centre, the first belt, the commercial city etc.) and the geography (the upper area, the area opened to the valley etc.). Thirty years after its construction, Monteruscello is waiting for a new transformation because the project was not completed and the main part of the residential buildings are today unsuitable for contemporary life. The new Monteruscello project is, at the same time, a study in its urban morphology, a recognition of its values but also its necessary and contemporary interpretation.

Methodology

In 1977 Carlo Aymonino wrote an essay in the international journal «L'architecture d'aujourd'hui» with the emblematic title *Une architecture de l'optimisme*. Aymonino stated: «If, as an absurd supposition, Aldo Rossi would design a new city, I am sure that the project might seem like a plan similar to those on which many American cities were founded two hundred years ago. A road system able to define the properties; a church that is a church, a public building of which you can immediately recognize the function, a theatre, a Law Court, houses; anyone could see if the building is consistent to its ideal. This is an operation that encourages both those who design it and those who use it.» (Aymonino, 1977). The features described in Rossi's city can be found in a foundation city of the twentieth century, built in the Phlegraean Fields area in the Campania Region and designed by Agostino Renna. Moreover, this city was built as a project intellectually more profound than the idea that Aymonino attributes to Rossi; indeed, Renna met Rossi in the Faculty of Architecture in Pescara and started an intense but not long cooperation in the School in 1967, the year after the publication of the first edition of Rossi's book *The architecture of the city*. Monteruscello is a foundation city that was built over 48 months for 20.000 inhabitants, displaced from Pozzuoli's city centre after the intensification of bradyseism in the Phlegraean area in September of 1983. In some ways, it is a city built as an application of Aldo Rossi's architectural theory. The area was chosen because there were 200 hectares of land with the same owner – the Italsider company, who also had financial problems – that were available in an inland area between Pozzuoli and Quarto and for this reason the expropriation was quicker and welcomed by Italsider. Many things were said and written about the 'uprooting' of Pozzuoli's population from land facing the sea and this often influenced opinions on the Monteruscello project. Today we cannot avoid re-evaluating the decision by the Dean of the Faculty of Architecture, Uberto Siola, together with the Ministry of Civil Protection and the Municipality of Pozzuoli, of building a new city, trying to give a new and permanent house to Pozzuoli's citizens avoiding the container phase, particularly in a Region where only recently the last prefabs dating from the 1980 earthquake were demolished.

Thus, this text will be on Monteruscello and *the Architecture of the City* but with two relevant precedents.

The first is the Master Degree thesis by Agostino Renna and Salvatore Bisogni, presented in 1965 titled *Introduction to the problems of urban design in the Neapolitan area* (Bisogni, Renna, 1966), and later published in n° 87-88 of the magazine «Edilizia moderna» edited by Vittorio Gregotti. While the drawings of the thesis are clearly referring to those by Kevin Lynch, the words by Vittorio Gregotti in the *Introduction* of the thesis' publication

are probably more useful to understand the originality, for its time, of the work by Bisogni and Renna: «(…) deriving exactly from the problems stated by the form, on the big scale, a new method for design on all the dimensional scales (…) Finally, it was to bring to the fore the real physicality and historicity of the concept of nature as material for Architecture.» Thus, the city is in relationship to the geography and this is especially relevant in a place such as the Phlegraean Fields where geography is 'cogent'. Monteruscello was placed on a steep slope, descending from south to north on the side of one of the craters of the Phlegraean system.

The second precedent to be assumed as a reference is the work of the *Urban Compositions*, prepared with his pupils at that time – Italo Ferraro, Alberto Forni, Enzo Mendicino and Francesco Domenico Moccia – and presented at the XV Triennale of Milan in 1973 in the "International Section of Architecture", edited by Aldo Rossi (Figure 1.). The *Urban Compositions* represent an experiment in construction of 'urban analogies' and a way to verify, on the scale of the city, a design technique based both on analogical and logical thought. In some of the compositions the residential urban fabric of the historical city is replaced by other kinds of urban fabric but also by the *project for a residential unit in the San Rocco district in Monza* by Aldo Rossi and Giorgio Grassi, a project from 1966 that inverts the relationship between typologies and urban morphology regarding streets and buildings. This work represents a method of theoretical reflection through drawing as a tool and became a text in 1974 in the essay titled *Perspectives for the Architecture of the Historical Centre*, in which Renna, talking about Naples, suggested that it is possible «(…) to provide the gradual replacement of the residential, unusable urban fabric by other that is better, up to the point of foreseeing, in a shorter or longer term, the substitution of the whole residential urban fabric (…).» (Renna, 1973). These words explain the importance that Renna attributed to the positioning and the design of the public buildings in Monteruscello to which he entrusted the task of defining the urban fabric and the identity of the city.

Returning to Rossi's theory, the author of *The Architecture of the city* defines the 'primary elements' as those that «(…) When we consider the spatial aspect (of them) and their role independent of their function, we realize how closely they are identified within their presence in the city. They possess a value "in themselves", but also a value dependent on their place in the city.» (Rossi, 1966). In Monteruscello the definition of the urban fabric is entrusted by Agostino Renna to its "primary elements", to the civic buildings of the city (the church, the town-hall, the theatre) but also to the collective buildings, probably of an inferior rank (the schools, the commercial gallery) but with a relevant value 'in their position and 'thematic' as in the case of – only one example among others – the High School building that becomes the wall of the 'ancient' part of the city. The role of these "urban elements" is clear also in Renna's drawings. First of all, in the plan where no houses are drawn, a balanced axiality replaces a more banal symmetry in placing public buildings but, nevertheless, the urban fabric is clear and defined. A similar idea is presented in other drawings: the axonometric view with the houses drawn in filigree and, on the other side, the church, the theatre, the health centre, the commercial gallery and the high school defined with their colour and architectural features; the perspective view from below where again the high school, in blue, and the commercial gallery, in yellow, represent the vertical planes of the city before that of the towering skyline of the houses above; finally, the plan of the higher part of the city where only the public buildings are drawn in their forms (that refer to the typologies) while residential blocks are hatched and the forms of the buildings can be only glimpsed. This kind of drawing describes a master plan – a "rule-design". In this regard, once again returning to *The Architecture of the city,* concerning the residential areas, the author states «(…)To take the dwelling as a category in itself does not mean to adopt a functional criterion of urban-land use division but simply to treat an urban artifact in such a way that it is in itself primary in the composition of the city. (...) One cannot argue (...) that a dwelling is something amorphous (...) The form in which residential buildings are realized, the typological aspect that characterizes them, is closely bound up with the urban form.» (Rossi, 1966). Renna was certainly aware of this while he was planning Monteruscello but he also knew that the building procedures in such an emergency would make it impossible to monitor all the phases – in fact,

Figure 1. *The city as lesson of Architecture*, team directed by Agostino Renna. Urban Compositions by I. Ferraro, A. Forni, E. Mendicino, F.D. Moccia. «Controspazio» n° 6, 1973

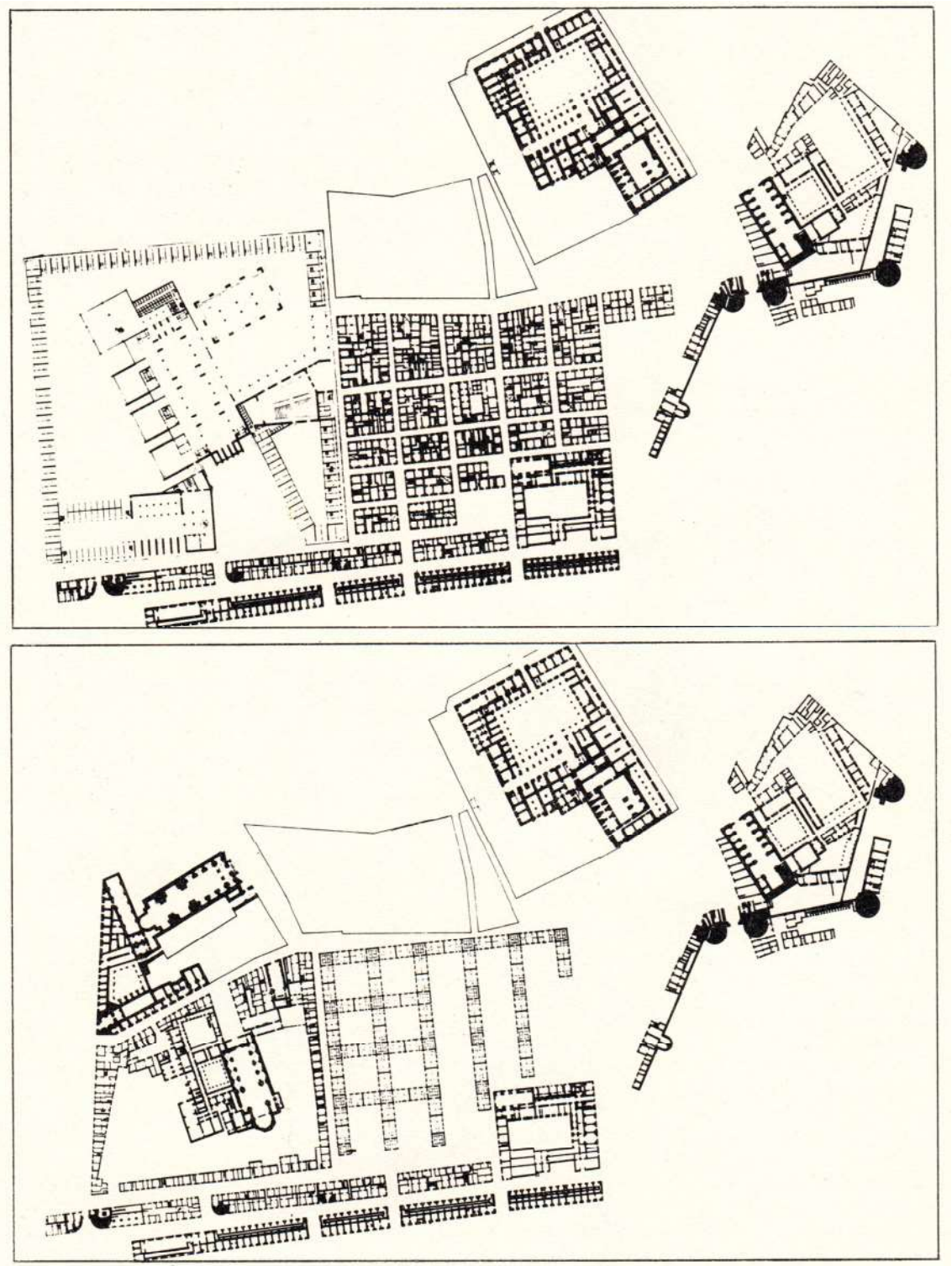
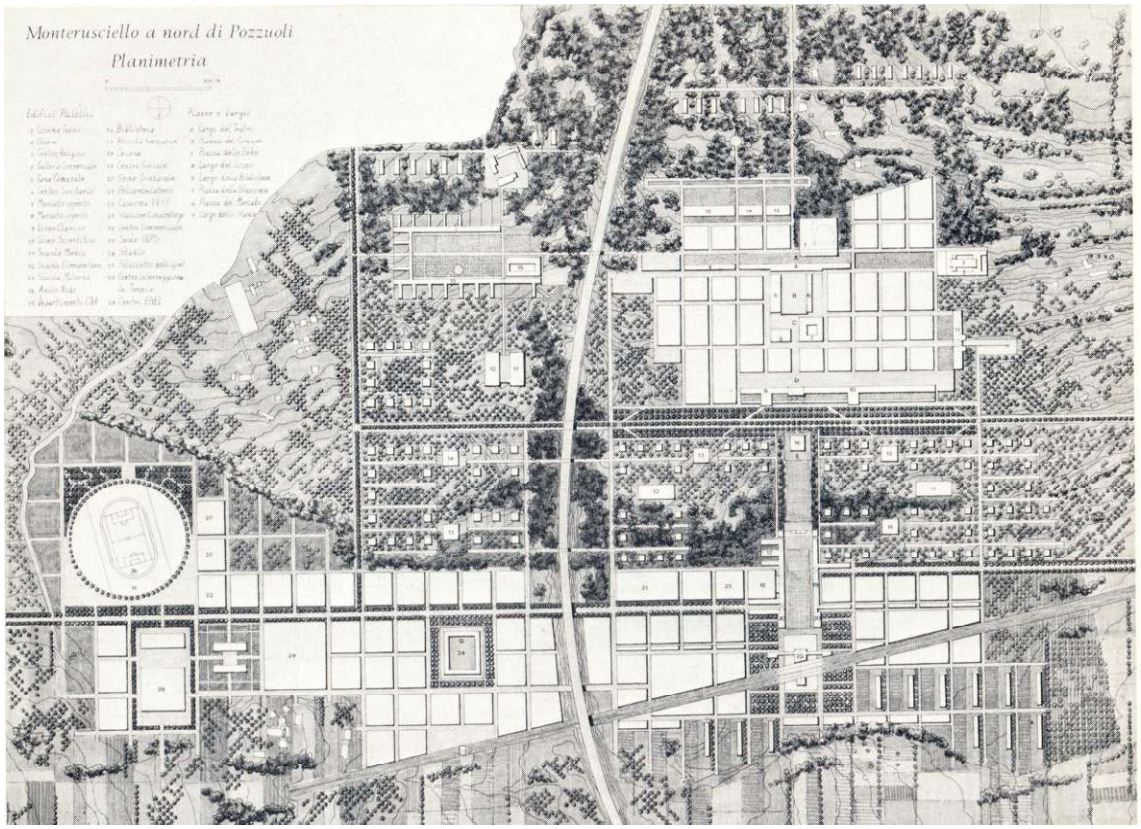


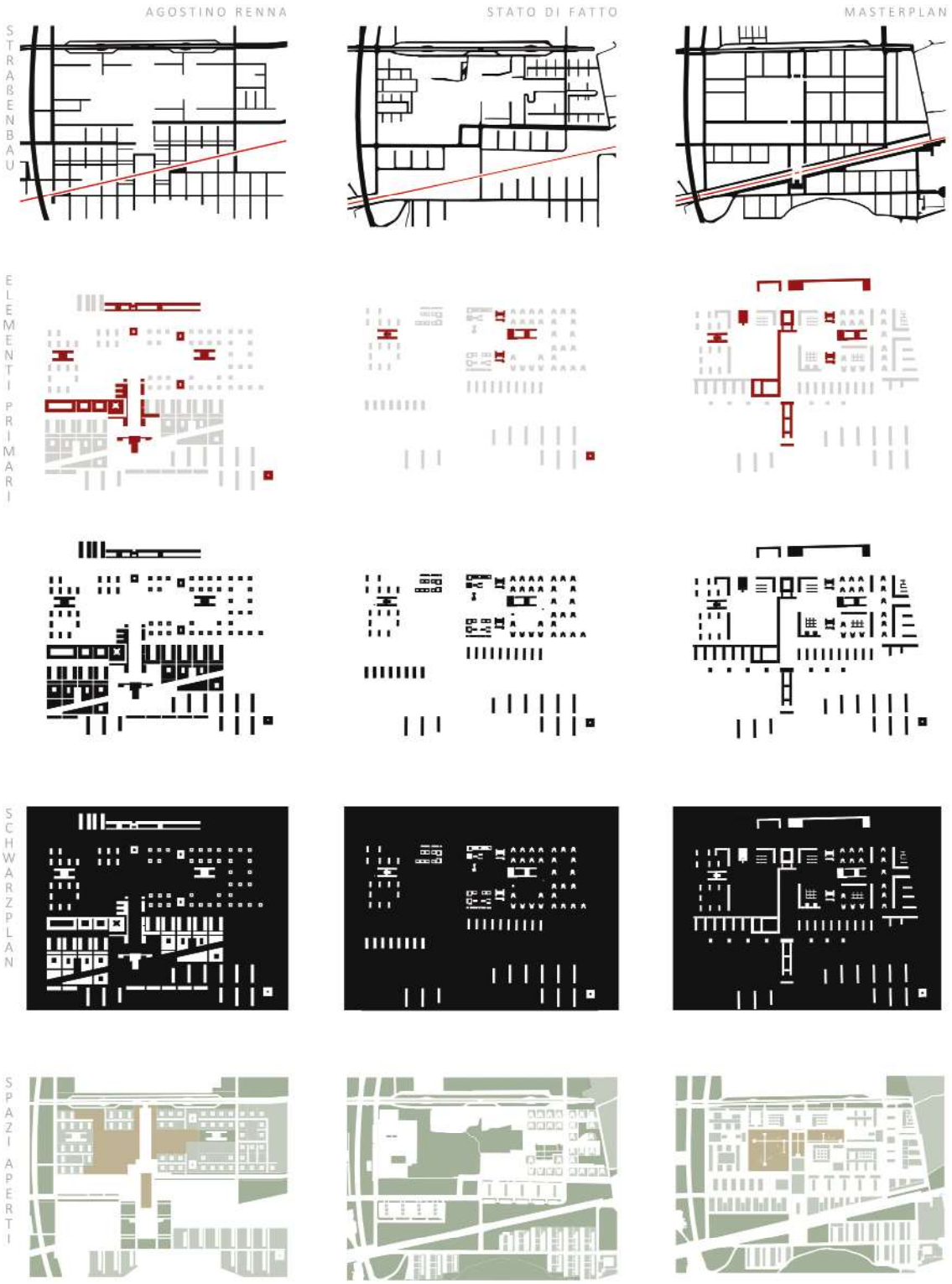
Figure 2. Monteruscello. General Plan. [Font: Escalona, F. and Francese, D. (1987) Monteruscello. *L'impianto urbano e gli edifici pubblici* (Giannini, Napoli)]



the very quality of the residences was one of the greatest point of weakness in Monteruscello's construction – and so proposed *Rules for implementing residence and building type* that defined typologies and morphological relationships setting density, coverage ratios, height, floor number and inhabitants for each type and the arrangement of different types in each area of the city. In this way, an Urban Plan for the city was designed through architectural tools rather than through hatching as in traditional urbanism.

The question of the 'how' and of the many 'whys' related to the residential system as the main point of weakness in Monteruscello's construction will be discussed further in this text, but there was another relevant question, as envisioned by Agostino Renna, on which the success of the city's foundation was based: the question was the relationship with an 'absent' history. The reflections of the group called 'Tendenza' were, in those years, with their differences, all aimed at recognizing urban value as a physical accumulation of the time of history in the space of the city and, thus, Agostino Renna's task was really difficult: the construction in a few months of a city in which the citizens could recognize themselves without stratifications of history and a collective memory. The answer to this question, in Monteruscello, combines the sacredness of foundation with an application of the technique of analogy on an urban scale. As for the first aspect – sacredness – Francesco Escalona (Escalona, in print) quite correctly pointed out that, in the first drawings of Monteruscello, a careful work of geometry and regular layout in the placing of civic buildings are evident and seem to evoke a kind of cosmogony where the sacred places are in an accurate mutual relationship (Figure 2.). On the other hand, as regards the technique of analogy, Monteruscello can be read as a city built through analogical references to other cities and this is exactly how Agostino Renna identified a way to give to this city, built in a hurry, its 'history'. The upper part of Monteruscello, to the south, is the

Figure 3. Urban analysis of 'lower' Monteruscello. The project by Renna, the current state and the Masterplan. Team directed by Federica Visconti and Renato Capozzi with Francesca Addario and Mirko Russo



'historical centre' of the city, an urban compact construction where the church and the town hall, among the other public buildings, are placed. The plan of this area of the city could be overlaid exactly with the plan of Priene, a Greek city in Asia Minor, built on four terraces on the side of mount Micale, with an orthogonal urban fabric of the IV century B.C.. Thus, the historical centre of Monteruscello became an ancient foundation city limited in the lower part by the long High School building that represents the theme of the city wall and is built covering different levels and evoking, in some of Renna's drawings, the blue gate of Ishtar in Babylonia. On the opposite side of the slope that goes from the south to the north, the lower part of Monteruscello is built around the railway station that represents another city gate both in a symbolic and functional sense. As in the city of the XIX century, the commercial and tertiary part of the city is located around the railway station in an urban fabric, again orthogonal, but with bigger blocks. On the 'boundary' of the lower city, the buildings, north-south oriented, are placed in the landscape like high 'blades' able to define a rhythm for the view of the city from the road coming from Pozzuoli. A vast 'green space' is sited between the 'historical centre' and the 'city of the XIX century' and here Agostino Renna experiments with other forms of settlement, referring to the idea of Modern city, with widespread housing scattered in nature; moreover, on an urban scale, this 'green area' clarifies the other two parts by separating them.

Agostino Renna did not write anything about this 'analogous composition' but it is very interesting to underline that, in 1981, even if only in the US edition, *A Scientific Autobiography* by Aldo Rossi was published. In this book the author stated that the architect must organize his memory, selecting things, choosing his references, storing them and then reinterpreting and working them out again, sometimes betraying them, through analogy (Rossi, 1981). The answer to a project is, in this way, for Aldo Rossi, the critical examination of the ideas of others, conceived in other times and in other places.

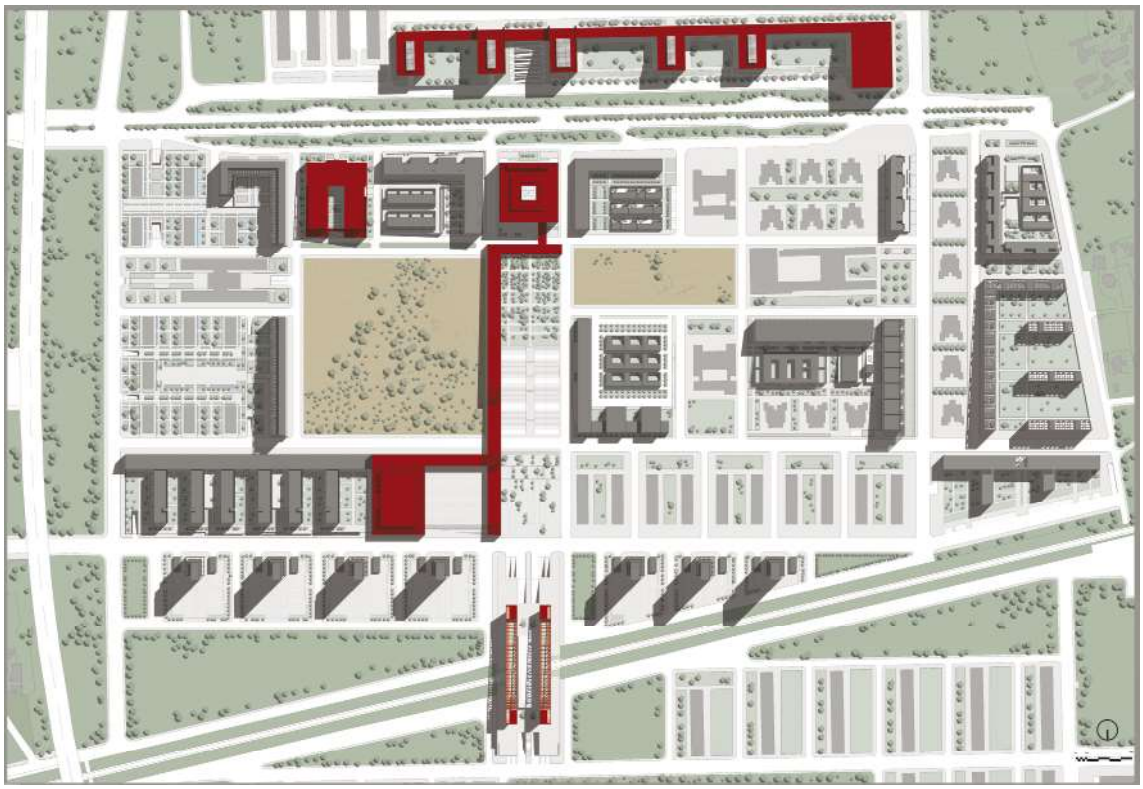
Agostino Renna in Monteruscello did this, making use of the cities that he knew, probably the cities that he admired, of the successful urban forms that, in his opinion, were able to solve the issues on the ground in Monteruscello. The most important theme was, among others, related to the construction of a city 'in parts', a city where the different parts could assume an autonomy on their own, in terms of form and sense, but could also co-exist; a city in this way able to have 'its' history even if only built in twenty-four months.

Thirty years after Montersucello's construction, this extraordinary experience can now be re-evaluated, after a certain length of time having past, confirming that the reasons for some of the problems and weaknesses, evident, are not related to the Architecture. Monteruscello remaines unfinished, many public buildings that were essential for the city's definition, in terms of urban form and functionality, were not built; also the designers of the city – above all Agostino Renna – knew that Pozzuoli's inhabitants could never feel at home away from the sea – it was necessary to wait for a child called Procolo who was born in Monteruscello –; the dynamics that resulted in the assignments of the bids for the residential sectors and the consequent choices in favour of heavy prefab construction produced buildings that inexorably, after only thirty years, are probably cheaper to demolish than to refurbish to contemporary standards. Thus, all reasons outside the architectural field but a condition that, today, requires – and probably demands – new work on Monteruscello, completing the system of the public buildings, replacing the residential and continuing the construction of the city and of its history.

Forming process

The lower 'part' of Monteruscello is today the most suitable for understanding and re-interpreting the overall urban morphology due to the fact that the historical centre is well defined even if it lacks some of the public buildings designed by Renna and presents serious deficits relative to the buildings in many residential sectors. The 'lower Monteruscello', unlike the historical centre, was built in fragments; the public facilities are almost completely absent; the non-construction of the railway station in this area – the old one being left in 'Grotta del sole' beyond the freeway's viaduct – makes it landlocked and inaccessible; thus, some choices at the time of construction probably today requires a

Figure 3. Masterplan for 'Lower' Monteruscello. Team directed by Federica Visconti and Renato Capozzi with Francesca Addario and Mirko Russo.



rethink, particularly those related to the use of the isolated block-house in the landscape that would be the predominant typology for the intermediate part of Monteruscello.

An urban analysis must be prepared prior to drawing up an overall plan for the area's regeneration involving both the original project by Agostino Renna – to understand in depth its logic – and the current state – to understand the differences but also suggest possible new lines for intervention not necessarily aimed at a kind of 'restoration' of the original plan.

The comparative analysis of the *Strassenbau* of Renna's project and of the current state (Figure 3.) underlines a regular layout in the first case where the hierarchy of the streets is clearly related to the contours of the ground. In the east-west direction, the streets – that present the wider section – define the main road system while the secondary connections are entrusted to a transversal system with north-south orientation and made up of smaller roads, driveways, pedestrian paths, urban stairs to solve the difference in levels in some specific orographic conditions. As has been said, this part of the city was only partially built, the rational layout was lost and, above all in the central part that was supposed to represent the 'nature-city', many driveways were built dead-ended, to serve the houses built here, often in a different design from the original project.

The *Schwartzplan* underlines, in Renna's design, the difference in density between the commercial and tertiary part around the railway station in the northern part of the settlement and, on the opposite side, a lower density in the central part bordering the historical centre to the south. The drawing of the existing demonstrates the betrayal of the original project. Probably in this area, not all built unlike like the historical centre in the first 24 months, the longer construction time made the provisions of the urban plan less mandatory. In the same way, the proximity to the 'centre' resulted in a higher saturation, above all of the areas near to it and then in the intermediate areas for which Renna's design hypothesized the lowest density.

The *Rotplan* is a drawing inspired by one of the first Monteruscello drawings where the 'primary elements' are in red and are represented in their form while the blocks of residential areas were hatched in orange and the buildings inside them were only transparent. This drawing is representative of the idea by Agostino Renna previously presented in this text: the urban fabric can be fixed by the public buildings while the typological rules are sufficient for the residential areas, imagining from the beginning, with a realistic and forward-looking approach, that they would later be replaced. The *Rotplan* of the project by Renna underlines the ability of the public and collective buildings to define the urban fabric while in the existing state the presence of only two schools in the intermediate part makes it impossible to recognize the urban design, above all without the residential areas. In this connection, the two 'red drawings' confirm the results in the *Schwartzplan*, pointing out fragmentation and incoherence in the two urban parts – nature-city and city of the XIX century – and also the leak of overall rationality in the placement of the residential typologies. Among other things, the boundaries of this urban part are lost: the absence of the High School building in the upper part to the south and of the 'blades' in the lower part to the north makes it impossible to identify this part and its boundaries. Finally, there is the design of the *green and open public spaces* to which Agostino Renna attributed great significance in the Monteruscello project. These two additional layers – green and open public spaces – contributed to the entire definition of the urban plan. The role of the green areas is evident also in the perspectives 'in the manner of Berlage' where the city is defined, in bird's eye views, in a strict relationship with the morphology of the ground where it is placed. The landscape is the background for the city – the park to the north – or nature – in the central part – where the houses are immersed. Referring to the public spaces, in 'lower Monteruscello', a problem is represented by the interruption caused by the archaeological discoveries along the central axis that connected the railway station to the street of the High School building. In the historical centre, the squares corresponds to a missing block – like *piazza degli aranci* – or to a block with public buildings – *piazza del Municipio* – or they are designed as particular spaces as in the case of the large street where the theatre and the church were placed as backdrops. In the lower part of the city the archaeological discoveries become 'scars' in the urban fabric, emerging with alignments different to those of the city on the surface. Here Agostino Renna redesigned the sequence along the central axis of the railway station, ending with an archaeological museum while the area of the excavations remains a space equipped with raised and covered pathways. The non-construction of both buildings left this area as an empty space without form where there are also problems related to an altimetry that presents a difference of many meters between the higher and the lower part.

Conclusion

Taking into account the results of the analysis, the revamped project for this area (Figure 4.) confirms the central axis and the construction of the museum and the railway station as necessary cornerstones and also of the High School building as the 'limit' of this urban part. On the contrary, the work on the residential areas is related to what emerged over time: on one side the ineffectiveness of the 'nature-city' model here often resulted in a sequence of enclosures and absence of public spaces and, on the other side, an 'inverted' density revealed in the different areas of the city that were built in a kind of decreasing gradation from the higher to the lower part. For this reason, a work of 're-stitching' started from the residential areas, re-establishing a precise typo-morphological relation between streets and buildings but, at the same time, introducing, above all inside the blocks, new residential typologies like, for instance, patio-houses. Conversely, to the north, a sequence of towers defines the skyline of the city from below and its limit, looking toward the landscape.

Finally, the repetition of *Strassenbau, Schwartzplan* and *Rotplan* for the new Masterplan represents an operation able to verify the coherence of the project related to that by Renna, on one side, and, on the other, its ability to solve problems which emerged

from its current state. What the project tried to achieve is giving new rationality to the road system, interpreting, as was said, the different densities of the urban areas, recreating the importance of public building system, making the green and open spaces good in terms of quality and form.

Giorgio Grassi, who worked with Renna on the reconstruction project of Teora, a village destroyed by the 1980 earthquake in Irpinia, wrote that Montersucello is «(…) in my opinion, the most beautiful project by Agostino Renna, the most 'his', from beginning to end: in the sense that here the world of forms that Agostino Renna began to isolate as "his" is fully evident. A world of everyday, natural, domestic and monumental forms (…) an ensemble of references, constantly present in his texts, that represents the most explicit and specific contribution to Architecture by Agostino Renna.» (Grassi, 1991). However, the legitimacy to continue working on this project, so "his", is given by the very understanding of Renna's ideas of city and architecture that he introduced in Monteruscello and also by the sharing of another idea dear to Renna: recalling Lévi-Strauss and once again Rossi, Architecture is human construction par excellence and thus, by its nature, an eminently collective artifact.

References

Bisogni, S., Renna, A. (1966) 'Introduzione ai problemi di disegno urbano dell'area napoletana', *Edilizia moderna* 87-88.

Rossi, A. (1966) *L'architettura della città* (Marsilio, Padova).

Renna, A. (1973) 'Prospettive per l'architettura del centro storico' in Pagano, L. (2013) *Agostino Renna. Rimontaggio di un pensiero sulla conoscenza dell'architettura. Antologia di scritti e progetti 1964-1988* (CLEAN, Napoli).

Aymonino, C. (1977) 'Une architecture de l'optimisme', *L'architecture d'aujourd'hui* 190.

Rossi, A. (1981) *A scientific autobiography* (MIT Press, Cambridge MA).

Escalona, F. and Francese, D. (1987) *Monteruscello. L'impianto urbano e gli edifici pubblici* (Giannini, Napoli).

Grassi, G. (1991) 'Agostino Renna. Il pensiero e l'opera' in Aa. Vv., QA12, «Quaderni del Dipartimento di Progettazione dell'Architettura» (CLUP Città Studi, Milano).

Pagano, L. (2013) *Agostino Renna. Rimontaggio di un pensiero sulla conoscenza dell'architettura. Antologia di scritti e progetti 1964-1988* (CLEAN, Napoli).

Escalona, F. (in print) 'Il caso Monteruscello' in Capozzi, R., Nunziante, P., Orfeo, C. (eds.) *Agostino Renna. La forma della città* (CLEAN, Napoli).

The relationship between non-residential buildings and urban form: modifications and transformations of the contemporary world

Gianluigi Maffei
Dipartimento di Architettura. Università degli Studi di Firenze. Via della Mattonaia, 14. 50121 Firenze

Abstract

After the analysis of the relationship between specialized building and urban form – an aspect that characterized the diacronic evolution of urban structure up to the XIX century – a strong evidence of the deep changes that cities are facing today emerges, in particular toward the relation between service buildings and their location within urban texture. Changes and transformations generate new meanings and a new updated of urban form quality with important consequences in the use of existing artifacts and for new linkages between users and urban conditions. Significant case-studies will be presented.

Up until the developments that occurred during the twentieth century, one could trace the rationale behind the location of non-residential buildings and their diachronic changes during different historical periods – when interpreting the evolutionary phases of an urban organism – back to their intrinsic structure and to the various different functions they each performed. Hence, the positioning peculiar to non-residential buildings was determined by the type of service they provided, and they were placed in either a polar or anti-polar part of the urban organism. For example, a cathedral and a town hall were polar[1]– and therefore located in the city centre – while the cemetery and factories were anti-polar and therefore found in outlying areas. In the modular growth typical of an urban organism, we can also easily see the different ways in which service-providing buildings changed. What emerges is that if buildings were polar, their role remained unchanged or, at most, they only grew in size and remained in the same place. In contrast, anti-polar buildings located on the edge of an older city would find themselves suddenly on a "reversed" axis[2] with subsequent urban expansion, whereby older anti-polar buildings were moved to new outlying areas, and non-residential buildings – constructed in line with the proportions of the newly expanded city – were built in their place[3].

Up until the twentieth century, when interpreting old town centres, we could also observe and reconstruct the hierarchies of urban routes throughout different phases of an urban organism's development. Routes differed according to their function and usually complemented each other. As regards this phenomenon, what emerges is a different use of the parts of a building that were more easily accessed from the street: ground floors. The varying levels of importance of particular routes during the relevant phase of urban development influenced a hierarchy of different types of services found along that route, just as it influenced the different functions of non-residential buildings. The main streets of a city had higher value uses compared to those found along minor routes and would usually be distributed from the centre to the suburbs in proportion to that particular phase of urban growth[4]. This fact determined the hierarchy of services found along particular routes: not just on radial streets if they were close enough to the "centre" of the urban organism, but also along ring roads. In any case, it was possible to read the circumstances, in all their complexity, at every level – from the entire urban organism down to a single non-residential building or the different use of routes for services – in a consistent morphological rationale that only suffered temporary delays or accelerations over time as part of an approach to how cities are typically constructed[5].

In the mid-twentieth century, after the Second World War and, later, in the 1970s and '80s, the criteria for determining the location of non-residential buildings for commercial activities changed enormously and led to a different rationale for other services as well. The main factors behind this new philosophy were the expansion of private car use and the importation of North American cultural models.

Up until the 1970s, American cities were clearly organised on the basis of a distinct contrast between the city centre and its outskirts, where the former was identified as the 'downtown' area, i.e. the executive and financial district of the city, supplemented with small subsidiary commercial activities, whilst the latter was the suburban city created by America's New Deal and was solely residential in nature. This juxtaposition was stretched to the limit by the expansion and consolidation of the service industry and the globalisation of the financial system during the 1980s. An immediate consequence of this was that many companies sought less expensive development conditions in suburban areas, cre-

[1]See G.Caniggia and G.L. Maffei's *Lettura dell'Edilizia di Base*, Alinea, Florence, 2008, p.171 and following pages (English edition: Interpreting Basic Building, Alinea, Florence, 2001)

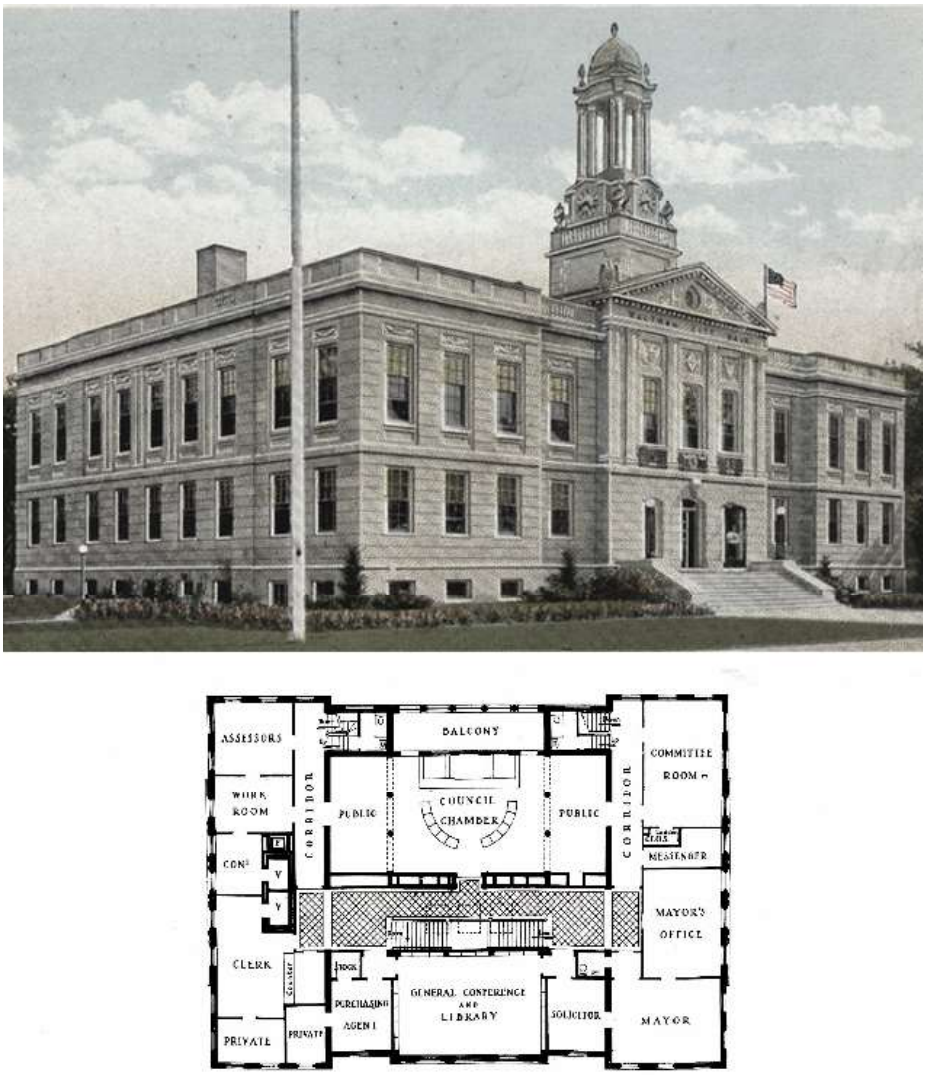
[2]Ibid., p.171and following pages

[3]Ibid., p.180 and following pages

[4]Ibid., p.190 and following pages

[5]See G.L.Maffei and M. Maffei's Lettura dell'Edilizia Speciale, Alinea, Florence, 2011, p.55 and following pages.

Figure 1. Waltham City Hall, Whaltam, Massachussets. Kilham, Hopkins & Greeley architects



ating true "office campuses" along the edges of the suburbs themselves. This phenomenon was made possible by the unique structural characteristics of American culture: investment in infrastructure equal to approximately 40% of internal revenue, an unlimited availability of cheap land, considerable incentives in the private transport sector and tax allowances for every single investment in the construction industry. The relocation of service industries generated urban "clusters" and "enclaves" scattered all over the country, which was still dominated by the mile-per-side unifying grid, where each sector included shopping malls, entertainment facilities and a quota earmarked for residential areas that were totally dependent on car use American cities of the 1990s consolidated this urban model, urban sprawl, where the built-up area was made up of a constellation of urban centres that found themselves competing with one other when offering resources and services to residents. This is the urban environment that developed and consolidated shopping mall culture. The associated urban phenomenon[6] changed the structure of the established city as well. Thanks to the relocation of offices to the edge of suburban

[6]See G.L.Maffei and M. Maffei's *Lettura dell'Edilizia Speciale*, Alinea, Florence, 2011, p.55 and following pages.

areas, extensive bare areas were created in high-density cities. Above all, many "light" industrial estates were converted into luxury residential areas, thanks to the phenomenon of "gentrification" where new social classes were forcibly grafted onto established urban communitie. This phenomenon resulted in a transformation similar to what even occurred in suburban areas adjacent to downtown districts: commercial and entertainment facilities associated with the large-scale retail trade altered the city centre's structure, creating new suburban conditions within it. Large car parks replaced what was once the traditional image of a city's public space. What emerges from this brief overview of the urban situation is how the phenomenon of large-scale commercial buildings was clearly an answer to a new urban model and vice-versa. We cannot rule out the possibility that these buildings may contribute to constructing the "image" of the new urban scene. In the USA, shopping malls – both those in the suburban areas of particular urban organisms as well as those scattered throughout the territory – with no direct relationship with particular cities are linked to a network of services that create their own system, covering the most densely populated areas of the country. These businesses are located in empty areas, they boast large car parks and are usually unassociated with pre-existing towns. Moreover, they do not lead to the construction of residential areas. Shopping malls are independent and self-sufficient, designed for a large-scale shopping spree that can last a whole day. Thus, the family who used to dress up to go shopping in the city centre on a Saturday afternoon or a Sunday has now transferred those same habits to shopping outlets and out-of-town malls.

At the same time, the globalisation of manufacturing has taken hold, whereby it is cheaper to import than to produce a vast range of products once part of our traditional production chain. Only avant-garde, high-tech products and quality and/or niche items have survived and are still produced on this continent.

This applies to Italy as well, where large-scale retail has created its sales areas, which are scattered throughout the territory and connected up to the national motorway network, based in specially-built facilities, usually constructed by imitating the general characteristics of traditional cities – with roads, city squares, parks and playgrounds – and sometimes even adopting the architectural/linguistic stylistic features of neighbouring areas.

This new service building relocation philosophy has caused significant changes in our old town centres, where they are widespread, both as regards non-residential and residential buildings, as anyone living in a city centre will have noticed. Many non-residential buildings in historic city centres have been abandoned and, having been deprived of their purpose(moved to outlying areas that are easier to reach), are left unused. Even the many shops found in older shopping precincts along a city's high streets have now either closed down or their use has been changed to meet the needs that have developed during this general transformation. For example, in "art cities" such as Venice, Florence and Rome, the increasing levels of "cultural" tourism have turned shops that were originally designed to meet the specific needs of residents (from basic shops to increasingly niche retailers) into a host of souvenir stalls, pizza takeaways and snack bars or, at the other end of the scale, high streets lined with boutiques offering the same complete range of luxury brands found in cities all over the world.

In short, we have lost the distinctive traits that made every place different, not just one city from another, but even different districts in each of those cities. Having observed a change in the morphogenetic philosophy at the heart of the current planning situation, we cannot but presume that a new phase in the organic evolution of cities is underway.

References

Maffei, G.L. (1980) *L'edilizia specialistica, in Materiali per un progetto di Architettura* (Teorema, Firenze) 205
Caniggia G. and Maffei G.L. (2008), *Lettura dell'edilizia di base* (Alinea, Firenze) 171.
Maffei G.L. and Maffei M. (2011), *Lettura dell'edilizia speciale* (Alinea, Firenze) 55.

Revitalizing Social Behavior through Build and Unbuilt Environment

Ar Aparna Parate
BSSA, NMIMS, V.L. Mehta Road, Vile Parle (East), Mumbai, India
Keywords: Urbanization, Social Sustainability, Interactive Spaces

Abstract

Last few decades have seen sharp increase in the speed, scale and scope of urbanization that has changed the character of the urban structure, giving rise to cramped spaces which are totally indifferent towards the local manifestations and the humane character of the space. Understanding the way in which environment affects the state of mind of people could enable the planner to design spaces to have positive influence on people's behavior and eventually reduce the negative effects of urbanization. This paper attempts to analyze and understand the complex environmental and behavioral issues that foster high level of psychological and physical well-being in urban residential complex by understanding the elements of 'Space Making' that contributes towards social interaction. It emphasizes on sensitizing architects to perceive the relation between spaces and human behavior. The study area selected is Mumbai, the financial capital and the most populous city of India, which has seen transformation from a fisherman village to a metropolitan and now is among top ten commercial centers of the world. However in this vertical growth, which is eminent for an island city, people are fast losing the neighborhood identity which was its cultural inheritance. The approach is to analyze various range and typologies of residential complexes based on their geographical location, relation to the city, housing typology, scale, design and planning and economical background of the residents. The study reflects that Interactive spaces and elements, helps and acts as stimuli for improved behavioral pattern of the society.

Introduction

Winston Churchill, addressing the English Architectural Association in 1924 said "*There is no doubt that there is an influence of built environment on human character and action. We make our buildings and afterwards they make us. They regulate the course of our life*."

Urbanization is inevitable, considering meager employment opportunities in small towns and difficulty in subsistence of entire family on small piece of agricultural land for developing country like India. The metro cities, buzzing with ample employment opportunities to migrant workers, fail to meet the basic living amenities due to sluggish pace of infrastructure creation. The population density has risen beyond acceptable level resulting in inhumane living condition for the masses. In the process, the spaces meant for social interactions, in the form of courtyard, open and enclosed gathering spaces; play grounds, parks, religious places, etc has taken worst impact.

India's golden heritage of healthy community life is almost getting lost. Such haphazard transformation of cities into metros has resulted into severe scarcity of land and thus given rise to cramped vertical towers resulting in drifting away from the vital link of social sustainability.

Need of Interactive spaces for shaping the social behavior

The notion of space in residential building is physically manifested through various elements of space making like, Centre, Nodes, Pedestrian Realm, Transitional Spaces, Connections - physical, visual & psychological, Effect of light & Ventilation, Solid and Voids, Scale and Proportion, Color and texture. These elements are examined that influence the design and help towards social interaction.

i. Centre

Centre is not just an architectural element, but, is a transitional space that is overlooked by the people in context to the built form around. Its mood changes with varying degrees of light and shade and with them changes the ambience of the abode. It not only provides light, ventilation, privacy, security and tranquility, but is a space that encourages people to connect with each other as well as to the nature. This centrally located program is like a visual anchor for the people.

ii. Nodes

Nodes are points, the strategic spots which are primarily junctions or hangout corners. They are important to create concentration of people in a community. All common facilities are generally grouped densely around a small square that function as nodes with the pedestal movement organized around these nodes. These are the active public spots where people feel comfortable to interact with each other.

iii. Pedestal Realm

Every building must be able to create a guide map for easy horizontal as well as vertical circulation. People should be able to understand their surrounds and orient themselves in the surrounding by making mental maps. The social interaction is encouraged when people rub shoulders in public – this is one of the most essential kinds of social 'glue' in the society. Outdoor movements should be encouraged by incorporating elements of spatial connections in design. If indoor streets cannot be avoided, then they should be designed so that people can linger around by enhancing the scale and proportion and making the space user friendly.

iv. Transitional Space:

Transition – an in between state. In Architecture it is defined as the connecting space between two confined spaces. Architectural spaces are incomplete without transition spaces. Other than being functional as circulatory routes for the building, these spaces are very important for the reasons of social life, aesthetics, health and comfort, and as emer-

gency exit routes. Transition spaces play a vital role in Environmental Behavior. The accurate use of these spaces in a built form may increase building efficiency to a great extent.

v. Connections

Connections need to be established not only between buildings but also between the occupants. Today people are closely connected physically and technically, but visual and psychological connection is lost. Therefore it is important to bridge this missing link for betterment of the individual as well as of the society at large. Connections need to be analyzed not only from physical perspective, but also from visual and psychological angle.

vi. Ventilation, Light, Shade and Shadows

The dynamics of colors and textures are especially sensitive to illumination. All colors, textures and forms respond instinctively to the light that falls upon them and creates a vibrant and lively ambience with dramatic interplay of light-shade-shadow. Good quality of light not only helps in visual connectivity, but also ensures psychological safety, security and a sense of togetherness.

vii. Solid and Void

Solid and void in architecture is the un-build volume of space in the built fabric. This un-built volume has variety of tangible and intangible functions to perform which involves direct and active participation of people.

viii. Proportion and Scale

It is essential to determine the proportion and scale of the occupied and unoccupied spaces that will help to establish good relation with the user. This creates a positive or a negative impact on the mind of the user. Massive scale dominates and overpowers the user and loses the relation with the user that discourages community living.

ix. Color and Texture

The psychological, aesthetical and structural potential of colors and textures is outstanding. Just as there are contrasting and complementary colors, there are also contrasting and complementary textures. Colors and textures enhance our visual experience and behavior - not only because of their obvious embellishment value, but also because of their spatio-plastic behavior. They are known to affect the human psyche. Appropriate application of color and texture has positive effect on human behavior and evoke positive emotional response.

Case study

India is colorful and vibrant, a land as diverse as its people with mosaic of culture and tradition that blends harmoniously and is respected all over the world. Community living is rooted in its culture, but urbanization and population explosions in the metros is major threat to community living.

Traditional and Contemporary case studies in Indian context are analyzed in this paper to understand the role of spaces & elements of space making that would help to shape human behavior. The study is based on the following parameters that would help to identified, compared, analyzed various interactive spaces:

- To sense and understand the elements of space design that endorses social interaction and its effective use in design.
- To understand why certain building complexes are more thriving and communicative.
- To analyze environment as a form of non-verbal communication.
- To understand the importance of physical, visual and psychological connections.
- To study the intervention of transitional spaces and their connectivity.
- To understand privacy vis-à-vis interaction and its impact on the user.
- Analyze various interactive spaces and understand how they help to shape the human behavior.

Figure 1. Keshveji Naik Chawl, Mumbai, 150 years old

Comparative analysis is done as to why certain building complexes are more humane and communicative than the other.

Chawls in Mumbai – Keshveji Naik Chawl, 1850 (150 years old) Figure 1

Chawl is a microcosm of a village, 4 to 5 storied buildings with single or two room tenements having common sanitation facilities. Found majorly in Mumbai, constructed in early 1900 to accommodate the people migrating to Mumbai because of the blooming cotton mills. The chawls appeared like a straight set of buildings from outside, but often when you enter them; they are more complex and organic. The corridor (common passage on each floor connecting all tenements), courtyard and street gives it a unique quality of interactive spaces that enhances the sense of community and nurtures a variety of cultures.

The occupants resist the change and fear of losing out on the unity, togetherness, security, companionship, cultural essence and ethos because of the city redevelopment.

The centre of the chawl, is a courtyard, a place of social gathering and interaction. Generally there is a temple or a tree in the heart of the chawl, always vibrant and occu-

Figure 2. Khotachiwadi, Girgaum, Mumbai, 157 years old

pied. Spectators hanging around the common passage in front of the rooms overlooking the youngsters busy with carom, cards and cricket matches are the common sight when one enters the chawls.

The junction of the private and the public space is not well defined; it is blurred and merges into each other. All the common facilities are concentrated in the central court that acts as a node. There is great sense of security and people do not feel lonely even when alone.

Common passage and the narrow wooden stair, though appeared small and congested, the people described it as spacious and big enough for them. This pedestal realm or corridor on each floor connect the one room homes and doubles up as a multipurpose space where they celebrate, talk, relax and unwind after a long day's work. This common corridor gives the feel of a single large house like an extended family.

In Chawl people remain connected to each other not only physically and visually but also emotionally and psychologically. The small one room 'kholi', force people to use the common corridor as a semi-private space for number of activities on regular basis. The nature of this space in the chawls is highly responsible for the interactive nature of the social fabric. The space constraint and the fact that people are forced to have close connection with each other resulted in a very rich culture. Even in today's busy schedule where people hardly know their neighbor; people living here are well connected. These are multicultural enclaves that nurture community life. There is a sense of security and community; that someone is always there for you with open doors. The un-occupied space, 'physically not occupied by the built form is always occupied by people.

The monotonous of wooden colour and texture is broken by the colorful hanging from the balcony that gives chawl liveliness.

But people living in Chawls have to compromise on light, ventilation and privacy. The only fenestration through which light and air enters into the living space is the door and

Figure 3. Wada of Pune

window that opens into common passage. This is the major issue which is forcing majority
 of younger generation to move out.

Wadi, Khotachiwadi, Girgaum, Mumbai (1855, 157 years old) Figure 2

Wadi is an old settlement, an urban village in the heart of the city. Walking in the streets of Khotachiwadi, one has no impression of being in the middle of a metropolis instead feels like a small village. The typologies of the precinct are low-rise houses with narrow streets, self-contained and preserve a very strong sense of identity, without being exclusive or gated.

Centre of the wadi is an open community space with a unique social fabric that is difficult to find in the contemporary housing schemes sprawling in urban areas.

The junction of internal streets forms a chowk or a node, which is a place for get-together and interaction. As surrounded by built mass, it is always shaded and is used for informal gathering through the day.

The narrow pedestal realm is lined by single or double storied houses that make the street live and personal. Here people not only walk, but talk and shout. The narrow whirling street gives the wadi a unique identity.

Each house has its own semi open verandah which is a transitional space that opens into the streets. This is majorly used by the elders and the women in the house, that keeps them visually connected and so the sense of loneliness is reduced.

The entire precinct consists of variety of spaces, from bunglows to chawls. These are connected to each other with narrow streets that widen at junctions. Narrow staircase with a projected balcony at the first floor keeps the resident connected to the ground. The sense of community living is very strong and that keeps them bounded.

The dynamics of colour and texture which is very prominent in the wadi, especially sensitive to illumination. It is this interplay of light-shade-shadow which dramatizes the visual environment. The streets remain shaded almost all the day, and are used for social gathering.

Negative or the open spaces in between the built mass can be considered as voids. These play a very important role in the formation of interactive spaces. The punctures in the solid allow light, ventilation and connect the resident effectively.

Figure 4. Housing Society, Belapur, Navi Mumbai

The unplanned organic character of the village, its diverse style, color and texture gives the wadi a vibrant nature and enhance the visual experience.

Wada, Pune, Western Maharastra Figure 3

Wada is a traditional residence in Maharashtra, India, typically a large building of two or more storey with groups of rooms arranged around one or more open courtyards. Social structure in wada is similar to a village settlement.

The wada is like the cube carved from the centre and appears solid from outside. The planning of wada is introvert with fenestrations on inner facade allowing people to peep from upper floor to the courtyard, thus keeping them connected to each other and privacy is also maintained.

The courtyards or "chowk" is the center for interaction between the residents and visitors. By their particular positioning, they segregate the rooms into public, semi-private and totally private categories. They contribute towards good light and ventilation. The rustic colour and texture gives it a unique quality. The wooden ornamentation creates shades and shadows on the façade.

Around the central courtyard which is the heart of the wada is a semi-covered passage, a transitional space between the public and private. This is where maximum interaction and activities takes place.

Being in close proximity to each other creates there is a special bonding, and sense of security. People learn to be more tolerant.

Housing society, Belapur, Navi Mumbai Figure 4

The 55 hectare housing society or 'Artist Village' brings an interesting mix of village atmosphere and culture. Designed by Indian architect Charles Correa, built for middle and lower income groups, the village is organic in its design and execution. A mixed-use building-block community is an organic evolution of the traditional courtyard block that creates a close-knit, secure, convenient, urban family in the heart of the city.

The village has hierarchy of courtyards, the smallest one used as a private space. Group of such modules are arranged around the larger courtyard which are used for community activities.

Each node draws towards itself the street that unwinds like a sprawling snake in the designed setup. The common spaces with community activities are grouped around the nodes that attract the people at all time of the day.

The space between the street and door is marked by a small transition space that is common for three dwellings. This space is connected to the street and marked with the change of light, direction, color, material and texture.

Pathways and pedestal realms are provided to interconnect the buildings for social bonding that happens naturally and also ensures security.

The open planning with hierarchy of open spaces connects the people to each other. The streets and path form enclosure with a strong sense of community living, thought in different houses, they live like an extended joint family.

The low rise cluster housing with hierarchy of open spaces allow ample amount of light and ventilation to filter in the houses. Each house has personal open space that provides privacy as well as enhances good social interaction.

The proportion and scale of the single storied structures are humane and there is always a connection between the built form and the user.

The planned organic character has its own style, color and texture that give it a vibrant nature. It reminds of the Konkan (coastal) village. The use of yellows, reds in the green backdrop is a typical 'Correa Style' that makes the settlement lively and tranquil to live in.

Contemporary Residential high rise Complex , Mumbai

An unrestrained urbanization is transmuting our cities. Horizons are punctuated with scaffoldings and a new grammar of glass and steel is taking shape, as old buildings and neighborhoods are replaced with small and large pieces of concrete boxes.

With the removal of architecture from its context, there is a slow extinction of features such as open spaces, balconies, high ceilings, pedestrian-friendly thoroughfares, exposed brickwork and use of indigenous material.

The centre of a contemporary residential complex is where the common amenities are provided such as the Club house, Gymnasium, Swimming pool etc. These centers and courtyards are very often dead. They are either surrounded by high rise concrete structures or placed at the corner of the site that is hardly used. They are designed in such a way that there is no interconnection with the user.

In most of the building complexes the problem of disorientation is acute. People have no idea where they are and experience mental stress. It does not interconnect and thus loosens the interaction that is most essential and is a kind of social 'glue' in the society.

There is generally a strict demarcation between the public and private space in contrast to the traditional gradual transition that created a positive impact on the user and does not appear as left out spaces.

People feel more comfortable in spaces that are connected physically, visually or psychologically. Due to high density each module is closely spaced, but the orientation of each module is such that maximum privacy is achieved. Thought being attached people hardly know their neighbor and no interaction as the doors are always closed. Due to negligible contact and interaction, people in this complex fear a sense of loneliness and insecurity. Seniors feel left out and find difficult to connect to the huge scale where people live like aliens. Sense of family and community living is lost.

The high rise building complex allows ample amount of light and ventilation in the flats. The shades and shadows created on the ground and façade create a dramatic effect. Plastered surface with color finish and paved surface makes an impact on human mind. The interplay of hard and soft surface generates interesting spaces but is rarely used during different time of the day by various people.

The high rise monolith and the large space around them appear dominating and over powering. They prevent the user from making personal contact. They control and regulate

Analysis of Residential Complex, Traditional and Contemporary:

Typology/ Spaces	Chawl	Wadi	Wada	Housing Society	Residential Complex
Centre	Open space between chawls	Open space private & public	Courtyard	Hierarchy of courtyards	Common Amenities
Nodes	Junction between private and public	Junction of hierarchy of street	Indoor and outdoor semi-open spaces	Streets and pathways	Open, semi-open and covered spaces
Pedestal Realm	Passages, staircase	Internal streets	Semi-open corridors around the courtyard	Internal pedestal streets	Pathways, jogging track
Transitional Spaces	Indoor passage	Semi-open space called varandah	Courtyard	Private and public open courts	Open, semi-open and covered, Common areas
Connections i. Physical ii Visual iii Psycho - logical	Passage, staircase, entry, common space	Streets, open space- private & public, balconies	Courtyard, verandah, passages, staircase	Streets, pedestal, open spaces personal & common, windows, doors	Jogging track, common amenities,
Light & Ventilation	Doors, windows, passage	Doors window, open space	Doors, window, courtyard	Doors, window, open spaces	Doors, window, balcony
Solid & Void	Built up and open spaces	Built up and open space	Courtyard and built up around	Built up and open space	Built up and open space
Scale & Proportion	Closely spaced, small open space in compared to built mass	Low rise houses placed hierarchy of open spaces	Scale of open courtyard in proportion to built mass around	Low rise houses places in groups with hierarchy of open spaces	Huge tall, over powering buildings with large open spaces with modern amenities around
Colour & Texture	Use of stone, bricks and wood that ones merged with the surrounds	Mostly wooden construction with tiled roof	Used of stones, bricks and wood	Plastered brick walls with bright colors typically Correa style	RCC structure plastered, colored with paved horizontal surface and lighting.

human behavior. People become more introvert and like to be in their own cocoon. Many find difficult to relate to the scale and are afraid to come out and interact with others. 'Status' becomes more important and the sense of community living is lost.

Conclusion / Recommendations

It is imperative that we need to change traditional residential complex to admit and accommodate over increasing demand of more homes, thanks to rapid urbanisation. Based on the analysis of residential complexes in urban context with emphasis on social interaction, it is suggested that introvert planning need to be adopted while designing multiple towers in confined layout. Interactive space making elements should be designed so that it enhances better social interaction. Multiple level spaces in towers should be created in such a way so as to keep residents visually and physically connected. This will encourage psychological and emotional bonding between residents.

Application of these interactive elements and spaces in contemporary residential complex will help to improve the quality of the built and open space and encourage community living which is the need of the hour.

References

Alexander, C.(1977), 'A Pattern Language Towns, Buildings and Construction'(Oxford University Press).
Rasmussen, S.E. (1964), 'Experiencing Architecture' (MIT Press).
Pandya, Y.(2007), 'Elements of Space Making', Mapin Publishing Pvt. Ltd.
Rapoport, A. (1969), House Form and Culture, Prentice-Hall, Inc. Englewood Cliffs, N.J.
Rapoport, A. 'Human Aspects of Urban Form-Towards a Man-Environment Approach to Urban Form and Design'.
Environmental Psychology – www.wikepidea.
Adarkar, N. 'The Chawls of Mumbai – Galleries of Life', Published by ImprintOne.
Vastu Shilpa Foundation for Studies and Research in Environmental Design, 'Residential Open Spaces – A Behavioural Analysis'.
Airoots – A blog by Rahul Sriwastava and Matias Echanove.
3XN Architects and Gehl Architects, (June 18, 2010), 'MIND YOUR BEHAVIOUR - How Architecture Shapes Behaviour'.
Diddee, J. and Gupta, S. (2013), 'Pune Queen of Deccan', INTACH, Pune, India.
Lynch, K. (1960), 'The image of the city' (MIT Press).

Urban morphology of Murcia (Spain) in the twentieth century. Compactness and density of urban fabrics

Fernando M. García Martín
Departamento de Arquitectura y Tecnología de la Edificación, Universidad Politécnica de Cartagena,
Paseo Alfonso XIII, 50, 30.203, Cartagena, Murcia, Spain
Keywords: Periphery, Murcia, Spacemate

Abstract

Expansion of cities during twentieth century, and especially in its second half, has raised, almost since its construction, a controversy about its consequences on the lives of their inhabitants. New urban fabrics appeared in this period as a response to the big population growth. Describing cities morphology, compactness and density have become two of the most functional values, as Berghauser and Pont have shown in the last years (2009). These two parameters are able to classify the urban fabric forms, allowing the comparison of their influence in issues as: quality of life, mobility, energy and material consumption, etc. Since Muratori's studies of Venice (1960), development of Geographic Information Systems (GIS) and the open access policies to public data enable a systematic management of huge amounts of information required for these studies. In this paper, public information from Spanish Cadastre is used to classify different fabrics. Methodology is based on combining compactness and density at building level and at urban fabric scale and it is applied to the case of the periphery of Murcia city, in southern Spain, in the last century. Results show the evolution of fabric morphology along the century and its contrast with contemporary urban design theories.

Introduction

The periphery of cities emerged throughout the twentieth century, and, especially in the second half, has risen, almost since its construction, a controversy about the convenience of their forms and their consequences on the lives of their inhabitants. During this period, new urban morphologies appeared as responses to the new situation of rapid population growth at the cities. The impoverishment of activities and uses in these new suburbs causes an intense discussion that ends up with a demonization of the new neighbourhoods.

However, that process has not had the same severity in all places and it can be guessed that some combinations of social, economic and spatial variables are more beneficial to the quality of urban life than others. Out of these mentioned variables, is logical to think that the built environment has an influence on the activities that people perform in it.

Years after the construction of these new morphologies, it is necessary to analyze the variety of urban forms used in the suburbs of Spanish cities, understanding the causes that originated them. That will help cities and their professionals to face the upcoming challenge of recovering those neighbourhoods with negative social, physical or economic trends.

This paper presents a methodology which allows a morphological classification of the suburbs of the twentieth century Spanish intermediate cities. A main advantage of this method is that it can perform an analysis of a wide area in a systematic way, allowing comparison of results. The recent availability of open public databases and the possibilities of geographic information systems (GIS) are crucial to this research.

Need of Interactive spaces for shaping the social behavior

The transformation of cities during twentieth century with an unprecedented population growth of urban environments caused the development of the study of urban morphology in the second half of that century. Those studies generated common tools to describe the new neighbourhoods and also to understand the forms of old historic places that had become desirables to preserve on that time.

The studies about the description of urban form can be divided into two groups, in relation to the objectives of this research. The first group, by the different schools of typomorphology, creates an entire set of concepts and definitions related to urban form. A second group is composed by several attempts to find measurable parameters to define and classify urban form.

The typomorphology schools identified the elements that compose the urban fabric. The variations of these elements explain the existence of different urban forms. Moudon (1994) distinguished three schools located in Italy (with Muratori and Caniggia among others), England (Conzen and the Urban Morphology Research Group at the University of Birmingham) and France (in the School of Versailles around Henri Lefebvre, Jean Castex, Philippe Panerai and Charles Depaule) with different backgrounds and objectives in their researches, creating a very useful body of definitions to describe the urban form since 1950.

These studies shared the interpretation of the city as an organism formed by interrelated elements that create components of larger scales. On this organisms, each of the elements is essential and irreplaceable (Muratori, 1960). This multiscale reading of urban form assigns to the built-plot the role of base element of the urban fabric. The building and its different relationship with non-built space, either the plot (private) or the street (public), is the key of many studies, being able to explain also the form of larger compounds.

This organism is built along the time, so it is also argued that the present form is historically determined (Conzen, 1960, Muratori, 1960, Caniggia, 1979). In the sequential process of building the city, each period has its own urban forms. Therefore, in the morphological reading, the continuities and crises that perpetuate or modify the shape of the city become basic, creating a typological process where some forms follow others.

From this interpretation of the city as a work of art created by the people of a place through a time, the French school of morphology highlighted that urban space is a result of a social construction. A society, with its characteristics and relationships among its members, establishes a series of space needs to perform its ways of life, its social practice (Lefeb-

vre, 1968). This cause-effect relationship happens in both ways, because urban space also presents restrictions to the ways of living of the society (Panerai, 1980).

Few years later, the research of qualities of urban form from the geometric and mathematical analysis began. However, it was not until more recent years, with the widespread use of computers, that the pursuit of measurable parameters bloomed explaining the urban spatial properties. Berghauser and Pont (2009) claim that this type of quantitative analysis expands the possibilities of typomorphology to explain urban forms.

Density was one of the parameters commonly used as a reference in urban form. It is defined as a relation where the denominator is always the ground area and the numerator relates mainly to number of houses, population or built area. It is interesting to understand the variety of density definitions collected by Boyko and Cooper (2011) that explain the different between them according to the purpose they are used for: number of rooms, living space, occupation, type of building, roads, etc.

In respect of city form, it stands out the studies of the spatial qualities of urban fabric according to their density. In them, even since functionalism (Gropious, 1930), it is appointed the insufficiency of density as unique value to define urban form (Martin & March, 1972). Berghauser and Pont's thesis, *Space, density and urban form* (2009), shows that combining building intensity (FSI – floor space index) and building coverage (GSI – ground space index) more accurate descriptions of urban form can be made. From the same two variables, gross floor area and footprint area, building height (L - Levels) and the spaciousness (OSR – open space ratio) are also obtained.

With the aim to reflect these four density index simultaneously, Berghauser and Haupt develop a diagram called "spacemate". In this diagram, the FSI value lies in the Y axis as an indicator of the intensity of use of the area and the GSI value on the axis X reflecting the compactness. Derived indexes of OSR and L, linearly related to the above mentioned, can also be represented in the diagram. Any urban fabric with a known pair of these indicators can be placed in the 'spacemate' obtaining the other two.

The diagram also displays the relationships among the four indicators, especially between the primary and the secondary ones. In addition, as the indexes refer to the unit of area, the possible distortion caused by different area sizes is removed and the diagram can be used to find similarities among different fragments.

Methodology for a typomorphological classification

The methodology for obtaining a typmorphological classification of the recent periphery of the city of Murcia use parameters of density and compactness as indicators of the spatial quality of the urban environment. Through the parameterization of urban fabrics, it is possible to compare their morphologies with quantifiable and objective variables derived from the spatial configuration.

To obtain these parameters, it is necessary to calculate the gross floor area and the footprint area of constructions at different scales of analysis. The approach in different scales, as Muratori indicated (1960), allow the understanding of the urban organism as a whole. Moreover, it helps to the correct delimitation of areas to be analyzed at each level. The different levels are: the whole urban area of the city, the periphery emerged throughout the twentieth century and the urban fabric scale of the neighbourhood as the smallest fragment.

For each of these scales, there is a first phase of delimitation of the study area and a second phase of characterization with quantifiable parameters. From these results, a set of indexes of compactness and density (GSI, FSI, OSR and L) that characterize each area of study will be obtained. Finally, the method concludes with the classification in types thanks to a combination of those values in different scales.

To carry out this work, in which one part is based on comparative research, the existence of a homogeneous data sources is required for the different case studies. In this paper, we have used the products available at the online office of the Spanish Cadastre (https://www.sedecatastro.gob.es/) accessible through digital certificate, according to public data policy followed by the Spanish government.

Figure 1. Murcia (left) and it twentieth century periphery (dark grey in right figure)

Delimiting study areas

The delimitation of the study area in each level requires setting up certain standards which define its conditions, discarding parts and cases that are not specific to this research. Obtaining these standards has been made from the study of several cities of similar size, avoiding the influence of local features. Therefore, it is possible to extend the method to other cities with similar characteristics, allowing the contrast of results.

On the largest scale, a framework of 15x15km is set as study area. The urban core of Spanish intermediate cities between 200.000 and 600.000 inhabitants fits into this frame, avoiding distortions in cases of very large municipality boundaries.

At the level of the recent twentieth century periphery, the study area is those census tracts that meet two conditions: that the FSI density value is greater than 0,35m2 / m2, and that the percentage of plots built before 1900 is lower 2.5% (figure 1). With the first condition, the low density areas, outside the scope of this research, are excluded. And with the second one, the areas belonging to the urban cores and pre-twentieth century settlements are discarded.

It is necessary to discuss the benefits and drawbacks of the division of the territory into census tracts, conducted by the National Statistics Institute (INE). On one hand, this division makes possible the use, in later stages, of the statistics variables contained in the Census of Population and Housing. However, the boundaries of these sections are not drawn according to morphological criteria which create some distortions.

In the last scale, at the neighbourhood level, it proceeds to dismiss the census tracts whose main use is not residential or whose development is not complete. The need for accuracy of the boundaries on this level is greater, so the limits have been redrawn to homogenizing criteria. However, to preserve the possibility of using the census data, all the buildings must remain into the new limits.

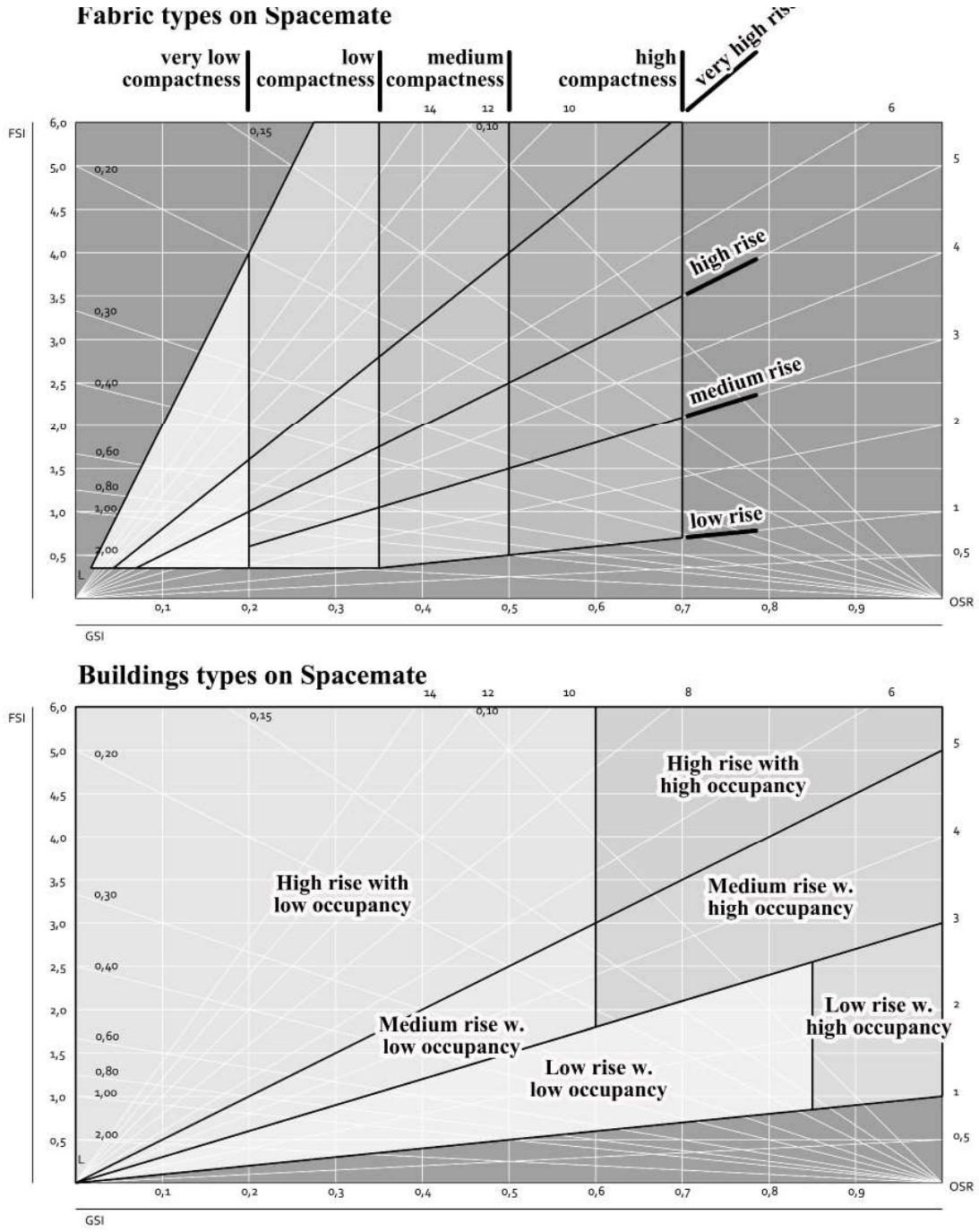
Types of fabric and 'spacemate'

Values of density and compactness of neighbourhoods cluster some of them with similar formal characteristics in zones of the diagram 'spacemate'. If this property of 'spacemate' has been sufficiently proved (Van Nes et alt, 2012; Kickert et alt, 2014; Steadman, 2014), there are some conditions that hinder reading in the diagram:

(a) Different types of urban fabric can overlap in the 'spacemate', since there are values of density and compactness common to different types.

(b) Urban fabric types occupy zones of different sizes in the 'spacemate', since values of density and compactness of each type may be more or less variable according to internal rules that characterize each type.

Figure 2. Fabric types (above) and building types (below) on 'Spacemate'



Exploring at the distribution of different types in the 'spacemate', some points can be highlighted:

(1) There are values of density that have never been reached on the suburbs of the Spanish intermediate cities. The compactness has not been less than 10% and not more than 70%. The average number of floors is only occasionally over 8 and the density has rarely been greater than 4m2/m2.

(2) Within these limits, there are fewer cases and fewer types in outlying zones, while the central zone is more populated and with more types overlapping.

From these observations, it can be concluded that the classification of the urban fabric

Figure 3. Typomorphological classification of Murcia (Spain). Very low and low compact fabrics types

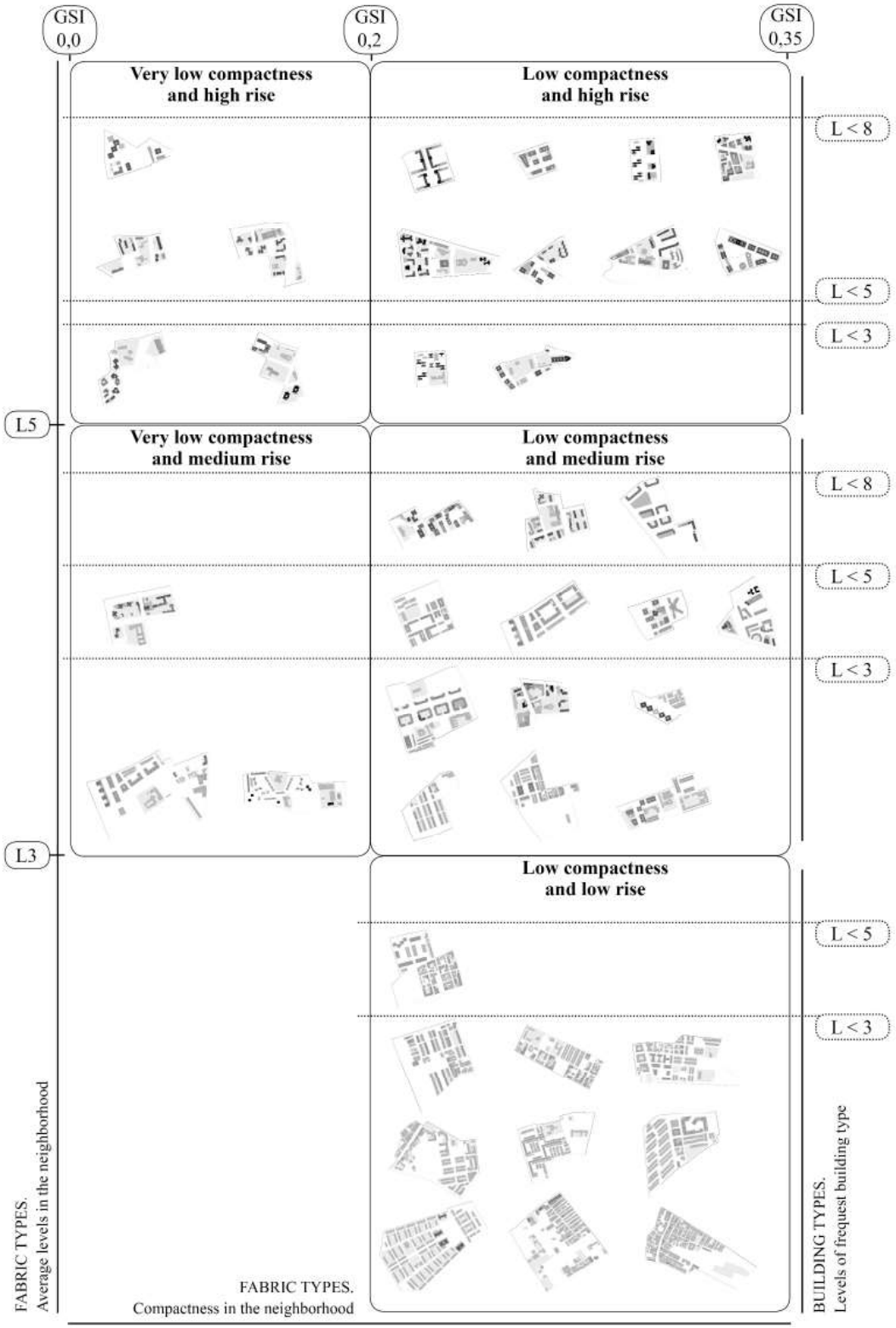


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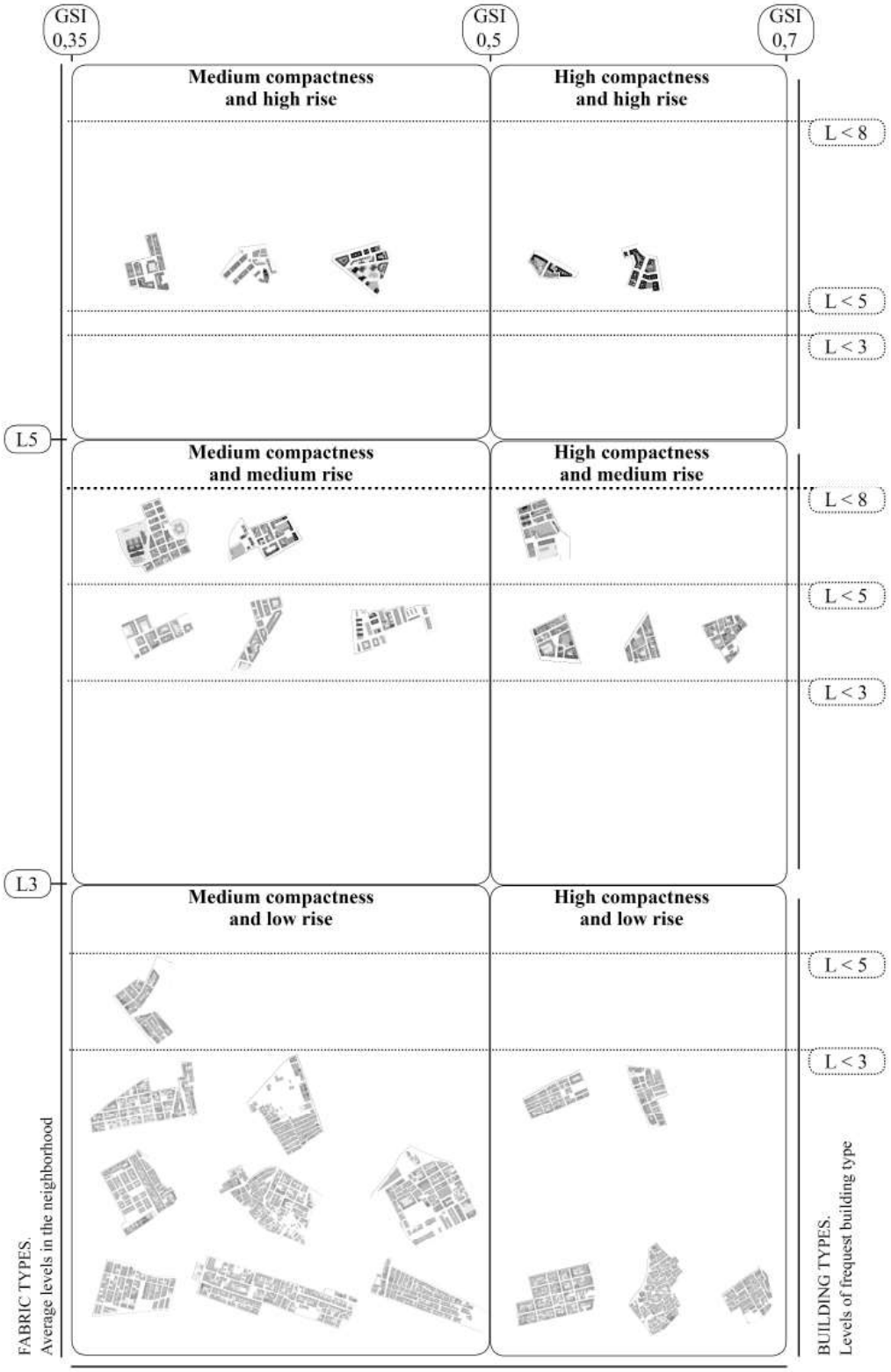
Figure 4. Typomorphological classification of Murcia (Spain). Medium and high compact fabrics types



with the only values of compactness and density does not offer sufficiently accurate and unambiguous types.

Combination of fabric and building types for a typology of recent suburbs

Due to the impossibility of distinguishing the forms of urban fabrics only with their values of compactness and density, it has been necessary to deepen the definition of types. Typomorphology schools has highlighted the preponderant role of the building type, or more specifically the 'built plot', in the definition of urban form. Different studies found the 'built plot' as the base element, that with its own aggregation rules creates fabrics with different spatial properties to satisfy the needs that the society required.

This relationship between component (building) and compound (fabric) is tested and operated in this research according to the density values. It stands to reason that the value of compactness of a tissue depends partially on the footprint of the buildings and also on the amount of existing streets and public spaces. Similarly, the density value of a neighbourhood depends both on their building types and on the restrictions they impose on the dimensions of public space.

According to this hypothesis, the morphological types are defined as a combination of compactness and density values of the urban fabric and of the buildings that compose it. The method has been conducted firstly by defining a typology of fabrics and a typology of buildings. Later, both types were combined into a typology of neighbourhood's forms.

These two typologies are defined on the 'spacemate' according to the values of FSI and GSI values of the neighbourhoods (census tracts in this case) and the plots. For the definition of types, it is necessary to adopt a series of criteria which have been taken mainly based on the characteristics of the object of study, as it was necessary in the definition of study areas in each scale. Tests conducted to date in other kind of urban areas, confirm the need to adapt this criteria to the study object in order to obtain an appropriate classification.

The fabric types (figure 2) are defined by limits of compactness (GSI) and average level values (L). Using "L" instead of FSI value makes the abstract types much more recognizable and close to the standards used in the profession types. Thus, the urban fabric types were defined by compactness: very low (under 0.2), low (0.2-0.35), medium (0.35-0.5) and high (0.5 to 0 7). Regarding levels, the types are; low rise (1-3 floors), medium rise (3-5 floors) high rise (5-8 floors) and very high rise (more than 8 floors).

Building types were defined similarly (figure 2) trying to keep the relationship between fabric and buildings. Thus, the types are separated by L ranges: low rise (1-3 floors), medium rise (3-5 floors) and high rise (more as 5 floors) types. On the types, the GSI of the plot has different limits depending on the height of the building: set at 0.85 the separation between low and high occupancy for plots with less than 3 floors and at 0.6 for those with more floors.

If difficulties of 'spacemate' for the definition of fabric types have been already discussed, inaccuracies would be even greater trying to define types of buildings. However, to make a classification of neighbourhoods, the combined use of both typologies has provided satisfactory results without more complex calculations.

The typomorphological classification of neighbourhoods uses percentages of each type of building as a complement to the urban fabric type. In this process, various levels of specificity may be achieved depending on study requirements.

In this case, for each type of urban fabric, various subtypes can be defined depending on the type of building existing in the area. To avoid an excessively large typology, some simplifications were made:

(1) Information of the most frequent, in percentages, building types is preserved in levels (L) and compactness (GSI).

(2) For the second most frequent building type, only information of L is kept.

(3) For the third most frequent, the only saved information is that one about if the levels are higher or lower than 5 floors.

Therefore, there are 16 types of urban fabric types and 41 possible combinations of building types, up to total of 656 possible types of fragments. However, since the types of fabrics can be composed only of some combinations of buildings types, the final number of neighbourhood types is reduced to 54 in the case of Murcia.

The final number of 54 possible morphotypes could be still interpreted as excessive for many purposes. But in this paper, it is useful to display a sequenced typomorphological classification in which it is possible to see the transition from one type to another (figures 3 and 4).

Conclusions

According to this methodology, the frame of 15 by 15 km studied in Murcia has 29.5 km2 built in a footprint area of 12.6 km2, with an average height of 2.3. The periphery, defined according to the above criteria, has an area of 15.8 km2 in which there are 13.7 km2 built in a footprint of 4.5 km2. Density of the periphery is 0,87 m2/m2, similar to the one in Malaga and lower than other analyzed cities like Palma de Mallorca, Cordoba or Valladolid in which the density is around 1m2 / m2. Compactness of this area is 0.28, close to other studied cities of similar size.

The most common types of tissue on the periphery of Murcia are of low compactness (GSI between 0.2 and 0.35). Almost 50% of the 131 neighborhoods defined have these features. Within this group, 16% have an average of less than 3 floors, 19.1% between 3 and 5, and 14.5% between 5 and 8.

Into this type are included: open-block neighborhoods with more than 3 floors, traditional suburbs of detached houses with large open spaces and new fabrics of low density detached house.

There is also a strong presence, 14.5%, of medium compactness neighborhoods (GSI between 0.35 and 0.5) with low rise (L smaller than 3). This type corresponds to traditional dense urban fabrics of detached houses, mainly located in a bunch of urban settlements placed around the main core of Murcia.

As indicated above, the urban fabric types located on the edges of the 'spacemate' are far less frequent. So, there is only a neighborhood with an average of more than 8 floors, there are less than 10% of very low compactness neighborhoods (GSI less than 0.2) and there are less than a 7% of them with compact fabrics (GSI greater than 0.35) and high rise profiles (floors averages above 5).

Figures 3 and 4 show, firstly, how the values of compactness and density in the fabrics, combined with the percentages of existing building types allow to better distinguish different urban forms in areas of the 'spacemate' where overlap several types. Furthermore, the ordered classification according to these parameters, reveals the transition from one type to another. Thanks to that, it can be appreciating how building types change in each of the urban fabrics.

This classification observes the principles of organicity described by typomorphology schools and it makes possible to assign values of density and compactness to the various organisms, the urban fabrics, taking in account how their elements are and how they are grouped.

It has been left out of this paper, for reasons of space, the methodology used to establish the period of the twentieth century in which it was built each of the neighborhoods in order to observe the evolution of the urban fabric types used in Murcia.

The potential of the methodology lies in the opened possibility to comparative studies of different urban areas.

References

Berghauser Pont, M. and Haupt, P. (2009) 'Space, density and urban form', PhD thesis, TU delft. (http://repository.tudelft.nl/view/ir/uuid%3A0e8cdd4d-80d0-4c4c-97dc-db-b9e5eee7c2/) accesed 1 june 2015.

Boyko, C.T. and Cooper, R. (2011) 'Clarifying and re-conceptualising density'. *Progress in Planning*, 76, 1–61.

Caniggia, G. and Maffei, G.L. (1979) *Composizione architettonica e tipologia edilizia* (Marsilio, Venezia).

Conzen, M.P. (1960) 'Alnwick, Northumberland: A study in town-plan analysis'. *Transactions and Papers* (Institute of British Geographers), 27, p.iii+ix+xi+3+122.

Gropious, W. (1930) *Bauhausbauten Dessau*, (A. Langen, München).
Kickert, C.C., Berghauser Pont, M. and Nefs, M. (2014) 'Surveying density, urban characteristics, and development capacity of station areas in the Delta Metropolis'. *Environment and Planning B: Planning and Design*, 41(1), 69–92.
Lefebvre, H. (1968) *Le droit à la ville* (Anthropos, Paris)
Martin, L. and March, L. (1972) *Urban spaces and structures* (Cambridge University Press, Londres).
Moudon, A.V. (1994) 'Getting to know the built landscape: typomorphology' in K. A. Franck & L. H. Schneekloth, eds. *Ordering space: types in architecture and design.* (Van Nostrand Reinhold, New York) 289–311.
Muratori, S. (1960) *Studi per una operante storia urbana di Venezia* (Istituto poligrafico dello Stato, Rome)
Panerai, P. et al. (1980) *Éléments d'analyse urbaine* (Archives d'architecture modern, Bruxelles).
Steadman, P. (2014) 'Density and built form: integrating "Spacemate" with the work of Martin and March' *Environment and Planning B: Planning and Design*, 41(2), 341–358.
Van Nes, A., Berghauser Pont, M. and Mashhoodi, B. (2012) 'Combination of Space Syntax with Spacematrix and the Mixed Use Index . The Rotterdam South test case' en *Proceedings 8th Iternational Space Syntax Symposium.* Santiago de Chile, 8003:1–8003:29.

New possibilities and challenges of the gallery apartments' renaissance in Shanghai

Zhenyu Li, Hongyuan Hu
College of Architecture and Urban Planning, Tongji University, China
Keywords: Shanghai, Gallery Apartment, Public Rental Housing, Possibilities, Challenges

Abstract

In 2013, a new public rental housing project, Xinyue Apartment in Putuo District in Shanghai was available for applicants. This project is formed with high-rise gallery apartments, which are increasingly rare since the housing commercialization (began in 1998). According to the government and developer's plan, more projects formed with gallery apartments will be built for the "sandwich class" in Shanghai. These characters of gallery apartments below to some extent contribute to its renaissance: suitability for small spaced households, high-efficiency for space utilization, capacity for prefabricated construction, flexibility for space reorganization and convenience for neighbors' social networking.

The renaissance of gallery apartments in public rental housing projects offers the city, the community and the residence new possibilities both in space and society: more diverse and delightful urban space, more open and welcoming community, more sharing and harmonious inhabitants. However, compared to these good intentions, the gallery public rental apartments' application in Shanghai is just the first step. Breakthroughs are expected to make the gallery public rental apartments beneficial factors in big city. The orientation limit, the stereotyped building form and the single presupposed function should be challenged in public rental housing projects.

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Foreword

Gallery apartments were once very popular in big cities in China in the 1970s and 1980s as a symbol of modernization construction. However, with the coming of the new century, the unit and tower apartments have got a predominant status among all the amalgamated dwellings and meanwhile the gallery apartments went into a period of decline. The housing commercialization (began in 1998) makes it possible, that consumers can buy big and comfortable residences actively instead of passive welfare housing sharing. In this process, consumers preferred unit and tower apartments, which could provide different living experience than the old gallery apartments with limited inside living space in each household. Researchers believe that this trend is due to the development of economy and the accompanying improvement of people's living demand. In this context, the form of gallery apartments was eliminated by the market.

Nonetheless, the situation has changed because of the increase of "sandwich class" residents in metropolis like Shanghai and their strong needs of affordable housing like public rental apartments. Thus, a renaissance of gallery apartments begins. In the new era, the renaissance is going to meet new possibilities and challenges at the same time due to the new construction technologies and new needs of residents.

Renaissance driven by public rental housing development

When talking about the gallery apartments' renaissance in Shanghai, the background can not be ignored, that the government is trying to solve "sandwich class" residents' housing problem by constructing a plenty of public rental housing. Since the publishing of a central government's document in 2010[1], public rental housing projects is becoming increasingly important in the housing security system of China. To fulfill the specific need of public rental housing, a different type of amalgamated dwelling is expected other than the predominant unit housing since the housing commercialization. In this context, the gallery apartment starts up after decades of despite.

From 2010, a series of new public rental housing project, Xinning Apartments in Xuhui District and Xinyue Apartment in Putuo District in Shanghai was available for applicants, which are formed with high-rise gallery apartments. Among all the Shanghai public rental housing projects in usage, Xinning and Xinyue Apartments are the newest constructed projects in Shanghai under the guidance of the government's document on public rental housing development. These characters below may explain why government and developers choose the gallery apartment type as the instructive example.

Suitability for Small Space Households. Compared to unit housing and tower high-raise, the gallery apartment can offer each small space household decent physical environment, which is vital for Chinese, especially in Shanghai, to choose their living space. Though gallery apartment has comparatively small face width and big depth for its small space units, it can basically offer every household natural lighting surface (south, east and west) and cross ventilation, which is barely found in small households in high-raise unit and tower apartments in Shanghai. The small household in a typical unit and tower apartments can only have natural lighting surface without cross ventilation.

High Efficiency for Space Utilization. In order to accommodate more residents in metropolis like Shanghai, where land for housing construction is kind of scarce resource, the land utilization efficiency in affordable housing projects like Xinning and Xinyue public rental apartments receives a lot of attention. Theoretically, unit apartment is the type with highest room rate[2]. However, this only happens in projects with large households, where one transporta-

[1]In 2010, 7 central government departments published a document "Guiding Opinions on Accelerating the Development of Public Rental Housing" together. The original Chinese headline is "关于加快发展公共租赁住房的指导意见（建保[2010]87号". http://www.gov.cn/gzdt/2010-06/13/content_1627138.htm

[2]According to the law in most provinces and cities in China (only except Chongqing), the housing price is based on the gross area. The room rate comes from the number of net area divided by

tion core serves no more than 4 households on one floor. In public rental housing projects, household's area is limited. In Shanghai the area standards of single room, double room and three room households are 40m^2, 50m^2 and 60m^2 at most according to the design guidance[3]. Under this circumstance, unit and tower apartments can hardly maintain the high room rate and gallery apartments can make the best use of vertical transportation cores, which have big occupation of space. So for public rental housing projects, gallery apartment is the type with relatively high space utilization efficiency.

Capacity for Prefabricated Construction. Compared with other forms of amalgamated dwellings, each residential unit in a typical gallery apartment could be nearly the same, which makes each component easily copied and prefabricated. Practices of modern architects like Marseille Apartments and "Plattenbau" in Germany have showed us the capacity for prefabricated construction of gallery apartments. As indicated before, the renaissance of gallery apartments in Shanghai is driven by the mass construction of public housing projects. In accordance with the design guidance by the government, the new built public rental housing projects should meet the requirement of housing industrialization to conserve energy and reduce emission[4]. The interior decoration should follow the full decoration mode and those apartments should be furnished with the basic fixed furniture and equipment. In consideration of the requirements above, gallery apartments deserve the prior building type for public rental housing among all the amalgamated dwellings.

Flexibility for Space Reorganization. Most gallery apartments are (fully or partly) organized in frame-shear wall system, which can provide "Universal space" in high-rise residential buildings. In this system, space can be freely divided and redefined by partition wall. Therefore, the inner space of typical gallery apartments can be changed to meet the changing demand of inhabitants. The spacial and functional flexibility will reduce the waste of resources. In some designs of public rental housing in China, architects have taken space flexibility in to consideration. The light partition wall system of each residential unit could easily transformed and the adjacent units could become one big unit as a consequence. The transformation would meet the new need of residents in the future. For example, from the typical floor plan of Xinning and Xinyue Apartments, it is easy to find out the possibility of inside space transforming. The neighboring two households could become a bigger one by removing some of the partition walls.

Convenience for Neighbors' Social Networking. Gallery apartments provide the residents a comparatively decent semi-public space between the outer space and indoor space. In most situations, the gallery space is more physically and mentally comfortable for people. For the residents living in public housing as Xinning and Xinyue Apartments, social networking between neighbors is a good way to make the community more harmonious. Most residents in Xinning and Xinyue Apartment are young people coming to Shanghai for better jobs. Their parents and families live in other cities. The gallery space of their apartments could become a public balcony for neighbors to come across, greet and talk to each other. In some projects in Japan and Europe, the social networking function of gallery space is even the core of design. According to Maslow's Needs-Hierarchy Theory, the communication function of shared space in amalgamated dwellings becomes increasingly important. Gallery apartment is now within this trend.

Possibilities to be explored in order to develop the living and space quality of gallery apartment

The indication of gallery apartments' renaissance in Shanghai gives rise to rethinking of this amalgamated dwelling type. After decades of standstill, the changing demand

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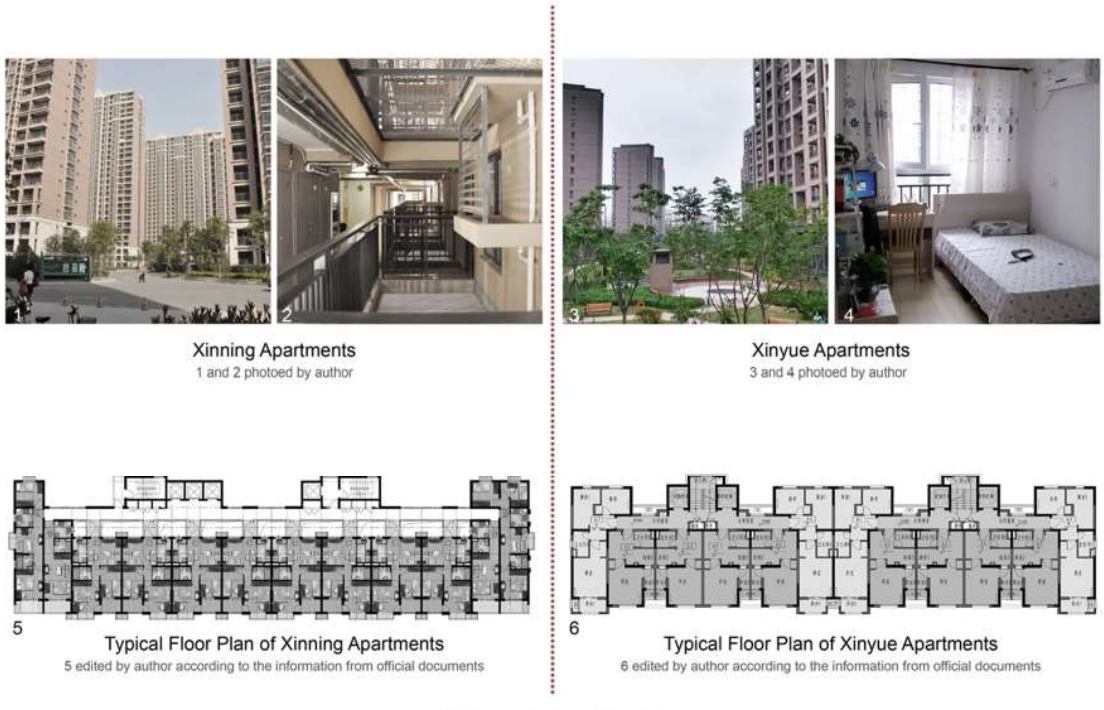
the number of gross area. To raise the room rate and make the best of use of home purchases to attract consumers, the developers often choose to minimize the public space on the floor.

[3]It is form clause 4.2.1 in "Design Guidance for Shanghai Affordable Housing (Public Rental Housing Section)". The original Chinese headline is"上海市保障性住房设计导则公共租赁住房篇（试行）".

[4]It is form clause 5.0.5 in "Design Guidance for Shanghai Affordable Housing (Public Rental Housing Section)".

Figure 1. Interpretation Chart: Renaissance driven by public rental housing development



1044 of housing make gallery apartments accepted by residents and developers again. The characters of gallery apartments nowadays have more advantages than before (as mentioned in the last section), especially in public rental housing projects in high-density metropolitan like Shanghai. To strengthen to vitality of gallery apartments, achievements are expected to be made in the aspects below.

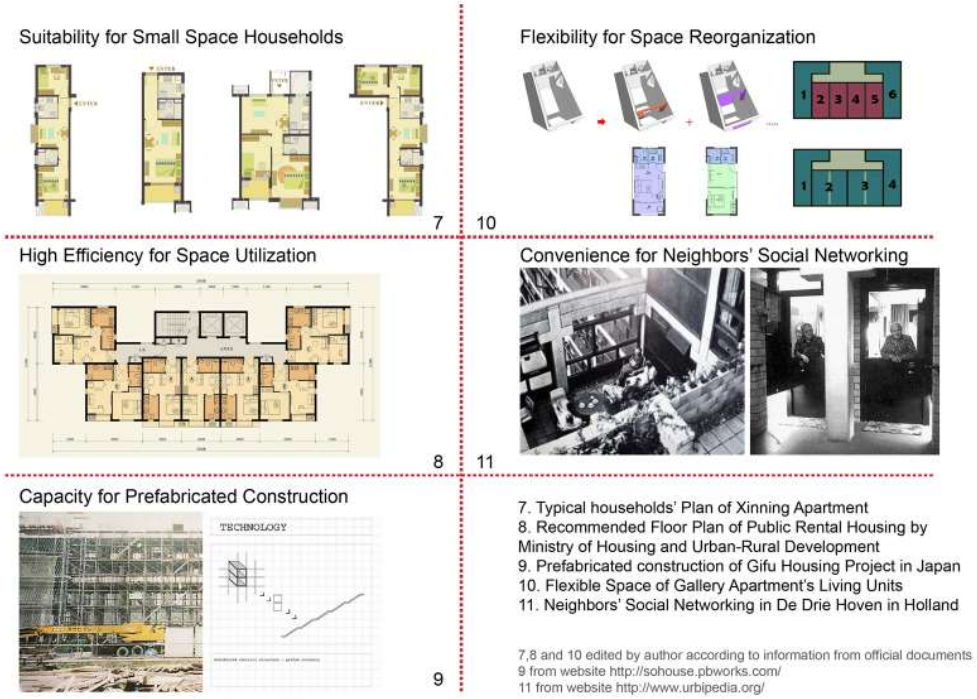
More diverse and delightful urban space. In many big cities in China, the urban views are to some extent more and more similar because of the copy of "optimal" developing mode. In the field of amalgamated dwellings, it is represented as a strong preference of unit apartments in row with high-rise towers. In new developed areas in Shanghai, the city texture and the street view are becoming boring and similar because most developers choose the "optimal" mode and the largely copied "Art Deco" facade style.

It should be recognized that some gallery apartments can be designed in a boring way, despite showing their form features: Xinyue Apartments look the same as those high-rise unit apartments in the neighborhood. This is a conservative approach as a beginning of renaissance. It is predictable that the diversity of architecture form will bring Shanghai more delightful urban space. Characterized and distinguished forms of gallery apartments like "Gifu North Amalgamated Dwellings" by Kazuyo Sejima and other three famous architects contribute to the urban space a lot.

More open and welcoming community. The gallery between private indoor space and the public outdoor space is a decent transition between the residents and the community. The gallery can be regarded as a big balcony and a double-skin facade at the same time.

As a super balcony, the gallery make the communication of residents in this building and the buildings nearby possible in a way of feeling safe. In units row and towers, the only communication channel is the window of private rooms, which reduces the feeling of safety. So many people choose to (or have to) close the curtains unless their story is high enough or far from community space. However, living in gallery apartments, they can observe and greet each other in public (or semi-public) space instead of directly through the window and feeling privacy violated. As a double-skin facade, the gallery

Figure 2. Interpretation Chart: Renaissance driven by public rental housing development



can weaken the noise before they getting into the private room where silence is concerned important. Besides, the gallery can be a creative element of the building's facade. A welcoming and impressive image will contribute to the residents' satisfaction, which would mentally be good to the community.

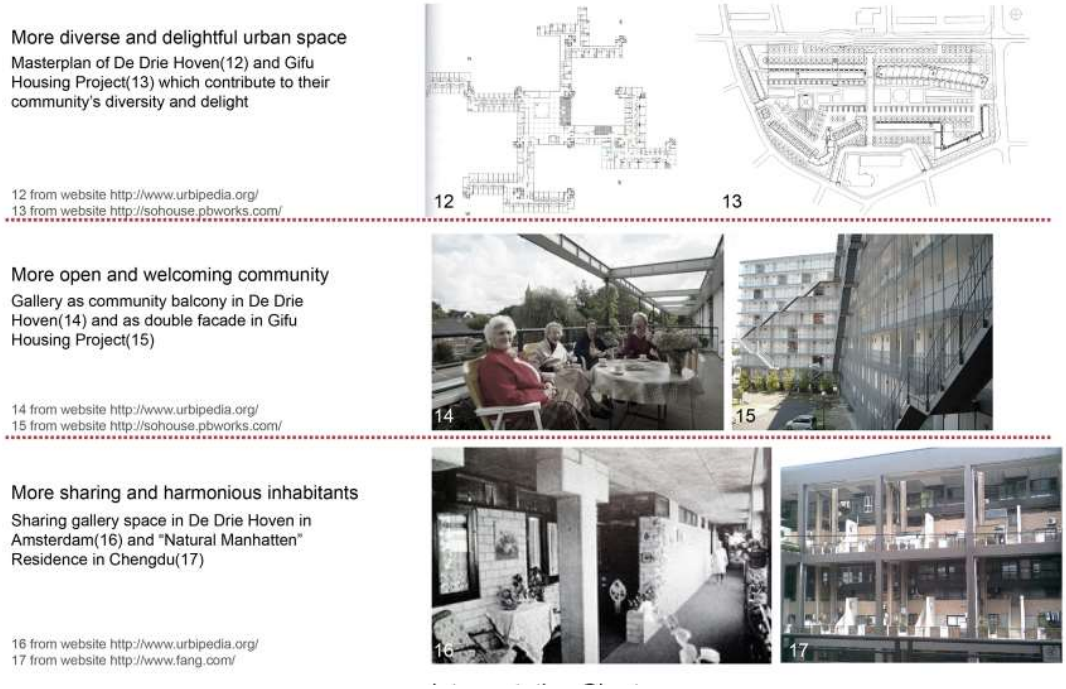
More sharing and harmonious inhabitants. It has long been a social problem that people in neighbor do not greet each other or even know each other in high-rise, high density amalgamated dwellings in big cities like Shanghai. It is reasonable because residents in these buildings do not have time and space to be familiar to their neighbors, especially those living in public rental housing apartments. This problem is complicated, but one reason can not be ignored is that most amalgamated dwellings give up the quality of public space before entering the door to pursue higher room rate. In this context, gallery apartments have obvious advantages against other types of high-rise amalgamated dwellings. The gallery can become a comfortable and decent place for neighbors' communication if particularly designed, which has been practiced and proved in some housing projects such as "De Drie Hoven" in Amsterdam, Holland and "Natural Manhatton" in Chengdu, China.

Challenges to be met in order to make breakthroughs of gallery apartments

The practice of Xinnong and Xinyue Apartments is encouraging and opened a gate for gallery apartment to show its potential in the new era of urban development. But objectively speaking, there still exists room to improve the design of gallery apartment to meet the enhancing needs of residents and citizens, which may lead to new types of gallery apartments. Breakthroughs are expected in both administration and design field.

The strict orientation limit in Shanghai. The climate of Shanghai makes its citizens value their apartments' orientation a lot. It is cold, wet in winter and hot, wet in summer. Therefore, residents want sunshine from the south to warm their home up in winter and they dislike the burning sunlight from the west in summer. The high humidity all around the year makes nature ventilation very important for residents. All the environmental factors together lead to strict local stipulations of housing's orientation.

Figure 3. Interpretation Chart: Possibilities to be explored in order to devolop the living and space quality of gallery apartment



1046 The clause before 2014 requests that, the orientation of new built housing project must range from 45 degrees south by east to 45 degrees south by west[5]. The orientation limit will strangle the possibility and creativity of gallery apartments' and all the other types of amalgamated dwellings' design. Along with the higher and higher development intensity in urban area of Shanghai, the government has responded experts' appealing by updating the local design standard. The new clause issued in 2014 has extended the limitation to make better use of the limited land resource[6], giving a suggested but not obligatory range from 30 degrees south by east to 30 degrees south by west. However, with the developing of mechanical ventilation equipment and high performance glass, the worry of facing east of west might no longer matter as it does now. The prospect of less orientation's limit and gallery apartments' diverse form is positive and predictable.

The stereotyped building form. On the background of mass and rapid urbanization by the government, a tremendous number of people come in to cities to settle down, which leads to a strong need of new housing projects, especially affordable housing like public rental housing. In order to provide more housing to new citizens in shorter time, the government and the relevant developers may prefer easy-replicated and stereotyped building form like the "Plattenbau" in eastern Germany, which architects and city experts are worry about.

It always seems that there is an irreconcilable conflict between construction efficiency, cost control and design diversity. The "Plattenbau" amalgamated dwelling projects mentioned before built in the 1960s and 1970s have become city problems nowadays. They were built in stereotyped building form to pursue construction efficiency and cost control and many of them are gallery apartments. With the development of residents' need, some of these apartments are removed for new high-quality projects and some

[5]"Design standard for residential buildings (2011)" 4.1.4 The original Chinese clause is "至少应有连个居住空间向南或南偏东35°~南偏西35°。在特殊情况下，其朝向可南偏东55°~南偏西45°。"

[6]"Design standard for residential buildings (2013)" 4.1.4 The original Chinese clause is "至少宜有连个居住空间向南或南偏东30°~南偏西30°。"

Figure 4. Interpretation Chart: Challenges to be met in order to make breakthroughs of gallery apartments

are transformed from inside to outside. Therefore, these experiences should be drawn attention to, when the renaissance of gallery apartments comes. 1047

The single presupposed function. Gallery apartment is a suitable amalgamated dwelling type for public rental housing projects in big cities and has a big advantage on its frame or frame-shear wall structure system for variable space. Gallery apartment has its potential of changing its function in the future if the residents and society's needs change. In Japan, Europe and some cities in the U.S., old housing buildings are transformed into hotels, offices and studios. This could be a predicable future for these gallery public rental apartments built today. Therefore, architects and developers should take gallery apartments' variable function into consideration while designing and building them.

In this context, frame structure should be preferred than shear wall structure under the same circumstance; prefabricated light partition wall system is a better choice than the traditional brick wall; height between floors should be left some margin for future evolution.

Conclusion

Gallery apartment is a characteristic type of amalgamated dwellings with a long history. In some periods, it is popular and in the others it is abandoned due to the always changing needs of residents. In these ups and downs, gallery apartments have also self evolved as a consequence of exploring new possibilities and meeting new challenges.

The key points to make the renaissance driven by public housing development sustain are space and function flexibility, prefabricated construction and expansion of gallery's community function. In the progress of this renaissance, architects and urban researchers should draw attention to these key points and make gallery apartments a positive element for better urban life.

References

Jahn G.(2011) *Life Between Buildings: Using Public Space* (Island Press, Washingto D.C.).
Carles B. i C.(2008) *Public Housing Designs and Inspirations* (Pageone, Singapore).
Kevin L.(1960) *The Image of the City* (MIT Press, Cambridge).
Junhua L. and P., Rowe G. and J., Zhang. (ed.) (2003) *Modern Urban Housing in China 1810-2000* (Tsinghua University Press, Beijing)
Michael, S. and E., Ben-J.(2003) *Streets and the Shaping of Towns and Cities* (Island Press, Washingto D.C.).
Zhenyu L. and B., Lu.(2014) '4 Suitable Design Strategies on Enclosed Housing in China – Case of Shanghai', 2014 UIA World Congress of Architecture, South Africa.
Zhenyu L..(2004) 'A Comparison of the Development of Housing in Berlin and Shanghai (1949-2002)', *Time + Architecture* 2004/03, 60-67.
Zhenyu L and J., Sun.(2009) 'Characteristic of Development and Plan-type of the High-rise Residential Buildings in Shanghai', *Urbanism and Architecture* 2009/01, 37-39.
Shiling Z.(2014) 'Reflections on the Basic Situations of Contemporary Chinese Architecture', *Architecture Journal* 2014/03, 96-98.
Jingmin Z. and Q., Miao and Hongsong, Si and Bin, Wang.(2014) 'A Study of the History and Future Prospects of Infill Construction System in Housing Fabrication in China ', *Architecture Journal* 2014/07, 1-9.
Bohan Z. and H., Hu and Wei, Zhang.(2013) 'Public Rental Housing Becoming the Gospel of Sandwich Layer: Taking Xinning Apartment as an Example', *Huazhong Architecture* 2013/06, 190-193.
Jie C.(2004) 'Research on Spatial Configuration and Suitability of High-rise Housings', unpublished M.Arch. Thesis, Zhejiang University, China.

Typological approaches of the modern cities (heritage of the k. und k. period)

Eva Lovra
University of Pécs, Faculty of Civil Engineering and IT, Marcel Breuer Doctoral School, Pécs, Hungary
Czech Technical University of Prague, Faculty of Architecture, Department of Urban Design and Spatial Planning, Prague, Czech Republic
Keywords: typology, structural changes, modern cities, transport, Dual Monarchy

Abstract

Different stages of urban development, as well as analysis and definition of its typological structurecould be significant in case of practical urban regeneration. The effectiveness of design and rehabilitation depends on the structural, morphological information of the urban fabric. The urban fabric of the modern city in the former Greater Hungary was formed between 1867 and 1918.

Before 1867 the development of the two basic archetypes of the Hungarian urban typology, steppetown in the Great Hungarian Plain and cities with European character, were differently influenced by the economic changes and distinct functions within the settlements and by the landscape features. In the period of the k. und k. since the development of the cities were specific, a new typology is recommended. Amongst the steppe-towns, highland towns and other cities, taking into account the similar topography and hydrography, can be discovered characteristics that have generated the development-line and structure in terms of existing differences. These factors, as well as the study of visual documents make it possible to follow changes of the spatial forms in the city in terms of its structure and functions. The study aims to examine the underlying system of the towns in order to present and define by a typology the structural changes with regard to the street lines and system of squares.

Introduction

The constitutional merger of the two states, the Austrian Empire and the Kingdom of Hungary followed by the Austro-Hungarian Compromise (1867) a unique state structure and development policy was created. The k. und k. period (Kaiserlich und Königlich - imperial and royal) refers to the Dual Monarchy of Austria-Hungary from 1867 to 1918. The city development of the dualist state took a new direction, partly because of the state-regulated city development (in case of the capitals, Vienna and Budapest), but the emerging economic development in the Hungarian territories and economic alignment by that time had a strong impact on the urbanization process. The urban fabric of the modern city in the former Greater Hungary was formed between 1867 and 1918. Before 1867 the development of the two basic archetypes of the Hungarian urban typology, steppe-town in the Great Hungarian Plain and cities with European characteristics were differently influenced by the economic changes and distinct functions within the settlements and by the landscape features. Amongst the steppe-towns, highland towns and other cities, taking into account the similar topography and hydrography, characteristics can be discovered that have generated the development-line and structure in terms of existing differences. These factors as well as the study of visual documents (maps) make it possible to follow changes of the spatial forms in the city in terms of its structure and functions after the economical and political changes. In the period of the k. und k. since the development of the cities became specific a new typology is recommended. The study compared the urban development of the cities in the dualistic monarchy of different territories (taken it as an example the capitals of the Dual-Monarchy: Budapest and Vienna, also Prague[1], as well as other smaller Hungarian cities). The research observed the period between 1867 – 1918 which focuses on the distinct status, demographical changes, different economic and political situation in spite of the dominant processes that influenced the establishment of the "modern city" meaning infrastructure development, the modernization of transport was introduced almost the same time, just some years apart. The research and the study hypothesized that the direction of the development is not necessarily determined by the state and its functional/political status. Otherwise, the infrastructure and transport development indicated the same principles of arrangement almost spontaneously for the effective modernization of the cities. The town planning, the regulation of the streets, road pavement, and partly the establishment of the electricity and water-treatment network are related to the intramural railway (tram) transport lines that were opened at the various districts of the cities. Public transport as well as the increasing number of the regional railway lines affected the improvement of certain parts of the city: the direction of the developments might be considered as a positive or a negative phenomenon. The results of the analysed period give answer not only to the evolution of modernizing towns, but also show the direction of the development in the past, giving guiding principles.

Different stages of urban development, as well as the analysis and the definition of its typological structure could be significant concerning practical urban regeneration. The effectiveness of design and rehabilitation depends on the structural, morphological information of the urban fabric. The study aims to examine the underlying system of the towns in order to present and define by a typology the structural changes with regard to the street lines and system of squares. The analysis is based spatial changes on the territories around the lines of the public transport as an indicator of the urban development, followed by the typo-morphological examination of the undeveloped (un-built) areas of these territories, under these circumstances can be identified the urban tissue, which mainly determines the contemporary urban fabric as well.

The evaluation of the structural changes and built environment, harmonization with the contemporary urban tissue requires analyses and an advanced multi-layered methodology for zones (types) identification, the level of protection and harmonization with the con-

[1]Prague was chosen, because it played leading role in the Monarchy, since Francis Ferdinand d'Este was in favour of a Triple Monarchy, expanding an Austro-Hungary Dualism into Austro-Hungary-Czech Triple Monarchy, but on June 28, 1914 he and his wife were assassinated in Sarajevo.

temporary urban tissue requires analyses and an advanced multi-layered methodology that could identify the zones (types) and hierarchy to identify the guiding principles in the urban development as well as an evaluation of the urban heritage.

Methodology

The urban fabric of the city and urban morphology can be defined by the study of the urban development sections in the period of the evolution into contemporary urban patterns. It is determined by the progressive evolution of the spatial changes, the interaction between the components of the urban fabric (streets, squares and green spaces, public spaces) and the transportation in the city. In the current study the basis of the typo-morphological approach can be described by socio-technical schemas and typified forms, the theoretical aspect constitutes the city's spatial/geographic characteristics, history and built environment. For the methodology, theoretical studies (archival materials, postcards, newspapers, monographs) and analysis of maps were chosen to achieve a method for the analysis of urban spaces by looking at characters to describe and illustrate the historical process of development of the city form and its spatial consequences. Appreciation of morphology, analysing the evolution and change in traditional urban space and the typology that defines zones and urban pattern are the key elements in considering local patterns in the nominative processes of urban development.

The proposed typo-morphological analysis system follows the Conzenian cognitive approach, with a combination of Caniggia's research methodology (understanding the built form through the historical process of shaping cities), and negates the doctrine by Benevolo which is that each city is unique. The process establishing rather a concept that each city (in case of the transportation caused changes in Hungary and the studied cities in the former Austro – Hungarian Empire) can be seen as a collage of different urban tissue types, the organization of which creates a specific city pattern and spatial plan of the city. In order to reach the adequate research frame, it has to be taken into consideration, that typology is a tangible form of conceptual thinking. It can be defined through special morphological composition which is both internally and externally organized and also has a relationship with the structures and adjacent spaces in order to make well defined clusters. In the current study, the typo-morphological approach is used instead of the urban morphological research view since the typo-morphology deals with the physical and spatial structure of the built environment and is based on detailed classifications of open spaces ("un-built" spaces) by type. Even if the idea of the typo-morphological approach is already defined, in our case generalized information about city development is not sufficient since the Hungarian towns went through a specific evolution during the study period, partially following the Western trends of city-development. In order to find the basis of the comparition of the selected towns with other cities (not exclusively Hungarian cities) the match points had to be found in the timeline of their urban development to determine the direction of the research.

The study of the cities was started by the organization of the important moments in the urban development followed by the period from 1867 - 1918 (+/- 15-20 years). The selected cities in Hungary, besides Budapest, Prague and Vienna were examined according to the same principles previously defined (Conzenian and Caniggian analitycal methods focused on the not built-in places, like streets, squares, green spaces).

The exploration period was divided into years, in this way occurences that occurred during the same period only a few years apart regardless of the city's status, geographical and political situation and variability of the population could be accurately observed. One of the indicators is the formation of public transport within the city which played a significant role in the development of the urban fabric as well as in the past, and nowadays has a great impact on the evolution of the urban fabric patterns. Following the line of the inner city transport routes of these three towns and examining the fabric of the selected territories on the line of the tram, as a consequence they could be identifiable pattern types that follow the same development shemas. Unexpectedly, these urban pattern types could be found in other cities of the Hungarian Kingdom as well, and therefore show similarities in the evolution of the largest cities of the former Austro – Hungarian Empire. The transport caused

urban typo - morphological determinations by establishment of a new system can be interpreted not only the space syntax, but it can unify and explain the different urban forms.

Case studies (Budapest – Vienna – Prague)

The three-city comparisons in the period between 1867 (1850) and 1918 (1920) was performed according to the following attributes: modality and structure (railway/lines and stations, bridges, underground, roads/boulevards and rings roads, public transport/ horse trams and electric trams, structural changes of the districts and outskirt of the city, river regulations, infrastructure/gas, electricity, water supply systems), demography, political and economical changes.

Observing the changes for the same period of time, in some cases similar time – event variation can be found (railways, public transport, infrastructure and river regulation), however, the significant structural changes were caused by the railway and public transport. The current study focuses on the tramlines and railway stations: public transport was evolved in the second half of the century, the rail stations played a vital role in the development of public transport lines since the stations were placed away from the city centre. The traffic towards the railway and from here to the city indicated the establishment of the very first tramlines, in addition, there were launched trams towards the hotels, relaxation areas, excursion destinations.

The first horse-drawn tramways appeared in the first half of the 19th century, between the 1850s and 1880s a lot of horse-drawn tramways were built in the municipalities of the Austro – Hungarian Empire. 1866: in Budapest the first horse-tram line was completed between Pest - Széna Square – Újpest - Városkapu and Kálvin Square, through Váci Way, 1865: Vienna, 1875: in Prague the first horse-car trams started to operate along the route Karlín - National Theater. The first electrified tramway in the Dual Monarchy was built in Budapest in 1887 between the Nyugati - railway station (1877) and the Király Street. 1897: Vienna, 1891: the first electric tramline towards Letná was opened in Prague.

The omnibus, horse tram and the electric tram changed the scale of the transport. The build-up of the efficient public transport systems in cities redounded the internal communications, circulation of the passengers and goods. The system of the avenues and boulevards that connected parts of the city and secured passage between the districts served the increased modal communication demands. The trams and suburban railways increased the cities' sprawl, build-up of the suburban districts, new industrial zones, suburban accelerated development and integration of new neighbourhoods.

BUDAPEST and the Hungarian Kingdom: the first test tram line between Nyugati railway station and Király Street was opened on November, 1887, the track gauge was 1,000 mm and the electricity was supplied to the cars on ground level, it was Europe's first exclusively inner-city electric railway. The second step in the expansion were two 1,435 mm gauge lines on 1889, the second line was operated from Egyetem Square to Fiumei Way via Kálvin Square. The third line was opened later on 1889 and drew from the Hungarian Academy of Sciences to the Andrássy Way. Budapest gained continental first position and international recognition with the underground was built between 1894 and 1896 under the Andrássy Way. The capital from 1895 onwards, gradually electrified the horse – car railway lines. Among the other cities of the Kingdom of Hungary in Bratislava in 1895 were established electric railways, in Szombathely in 1897 June, in 1897 July in Miskolc, in the autumn of 1897 in Subotica, 1899: Rijeka and Timisoara, 1900: Sopron and Satu Mare, 1905: Sibiu, 1906: Oradea, 1909: Szeged, 1910: Zagreb, 1911: Debrecen, Novi Sad and Nyíregyháza, 1913: Pécs, in Košice in 1914 appeared the first tramline.

ANALYSE 1: Urban tissue typifies on purpose to define the spaces free from built-in.

VIENNA: The very first horse tramlines were established in 1840/1842 (track gauge: 1,435 mm), led from the Donaukanal to the end of the Jägerstraße, by 1865, trams were operated between Schottentor and Hernals, and in 1866, the route was extended till Dornbach. The first steam tramway line (track gauge 1,435 mm) between Hietzing and Perchtoldsdorf was completed in 1883. In 1887 the line was extended further south to Mödling, and towards the city centre to Gaudenzdorf and to Ober St. Veit. In 1886 a line

from Donaukanal to Stammersdorf was opened, at the terminus the trams were connected with trains on the Stammerdorfer Lokalbahn to Auersthal. 1897: the first electric tram operated from the Westbanhof to the Praterstern via Kaiser Street and Franz-Josefs railway station.

ANALYSE 2: Urban tissue analyse in case of Vienna (territories around the railway stations and tramlines).

PRAGUE: The first horse-car trams line were grounded in 1875 along the route between Karlín and the National Theater, a year later the track was broaden west of the National Theater, through the Smíchov railway station, in 1882 the network was extended to Vinohrady and Žižkov. In 1891 the first electric tram line was opened in Letná, a recreation outside of Prague, in 1893 the line was developed to the Governor's Villa. In 1896 was opened the second tramline, which leads from Florenc to Libeň and Vysočany, linking the industrial outskirts of Prague with its centre, in a continuation another new line was opened in 1897 from Smíchov to Košíře.

ANALYSE 3: The objective of the analyse is the identification of the typo – morphological characteristics of the open spaces.

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Conclusion

The modern urban infrastructure, built-up in the 19th century exerted complex effects in the settlements. The municipal supply systems as the modern city attributes contributed in a new type of urban lifestyle appearance, but the specific service activity induced in more significant changes. It influenced the city's development, acceleration of urbanization, the functional urban modernization, the development of new types of urban functions and economical transformation. Cognitive and attitudinal changes have contributed by causing inception of the "modern city" idea. The water supply and sewage water systems, gas and electricity lines, street networks, pavements, public transport are built of heterogeneous elements in order to complete the complex interactive, closely related based urban infrastructure system was created.

Despite the site-specific development of the cities in the former Austro - Hungarian Monarchy it could be stated that due to the urban developing effect of the public transport, similar spontaneously created or planned formations were emerged. In the studied cities the operation of the first trams were not related to the city's status, and its legal/ economical role in the monarchy, it can be observed that in the territory of the Monarchy an intense modernization process took place, and one of the accompanying events was the realignment and modernization of the transport, routs, street-network. Budapest is one complex example of the specified development of the archetypes of the Hungarian cities. Before the unification of the capital, Óbuda and Pest - Buda represented those types (steppe-town and western type), which dominated before the Austro – Hungarian compromise (1867). The following economic development has resulted in diverse types of development. Through the example of the growing Hungarian city of Budapest were made parallels between the provincial Prague and the other capital, Vienna. The result of the analysis can be treated as evidence of the proposed hypotheses, because the development of the urban fabric of these cities were caused by the public transport, formation, typo-morphological similarities are independent of their role in the monarchy and their stage of development. The defined typo-morphological units of the city's urban fabric can be discovered on the layout of all three cities and other Hungarian cities as well. Due to the development force of the trams street regulation was started,

Figure 1. Typo-morphological analysis of selected areas - case study: Budapest

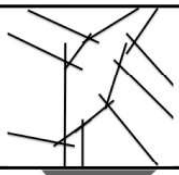
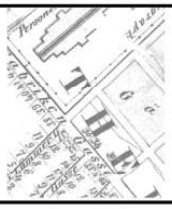
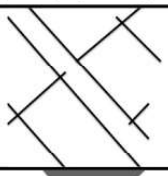
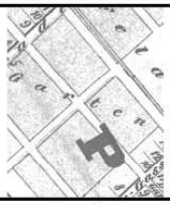
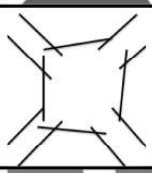
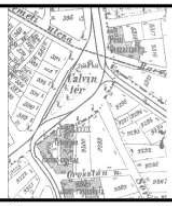
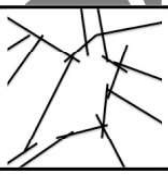
BUDAPEST	INNERT CITY: PEST and BUDA 1854 (Source: Arcanum, BFL)	ADMINISTRATIVE MAP of BUDAPEST 1895 (Source: Arcanum, BFL)	SERIES of CADASTRAL MAPS of BUDAPEST 1912 (Source: Arcanum, BFL)	SCHEMATIC FIGURE OF THE URBAN SPACE and SPACE SYNTAX	TYPE
Nyugati railway st. and surrounding					Symmetrical diagonals with rectangular blocks and planned square (star – shape square), transport hub, expanded street 'estuary' formed square
	equal street hierarchy, planned spatial units, regulated streets, closed geometric plots	Widened roads, the central square is liberated by wrecking, at the encounter of the main roads	Thickening tram-lines, the irregular square that is built at the fork of roads has no hub		
Podmaniczky Str. and surrounding					Symmetrical diagonals with rectangular blocks, junction of regulated streets, closed geometric plots not visible sub-elements
	equal road hierarchy, regulated streets, geometric, regular plots	widened streets, equal road hierarchy, regulated streets, geometric, regular plots	Widened streets, equal road hierarchy, regulated streets, geometric, regular plots		
Oktogon and surrounding					Square was cut of the two opposite corner of the blocks, expansion, central function, representative and public junction
	equal road hierarchy, regulated streets, geometric, regular plots	equal road hierarchy, regulated streets, geometric, regular plots, square: in the section of the roads	Square was cut of the two opposite corner of the blocks, expanded sqzare		
Kálvin Square and surrounding					Symmetrical diagonals with rectangular blocks and planned square (star – shape square), public transport hub with the urban layout accent: the Kálvin – church
	The development of the star square at the encounter of the roads, regular roads, triangular built-in type	Star square, regular roads, triangular built-in type, public transport junction	equal road hierarchy regulated streets, geometric, regular plots, central geometric planned square (star shape)		

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Figure 2. Typo-morphological analysis of selected areas - case study: Vienna

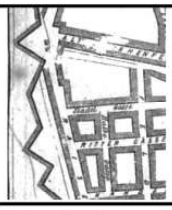
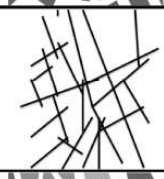
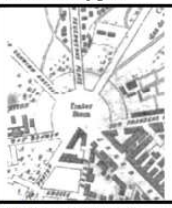
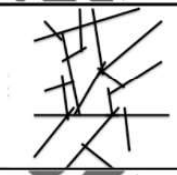
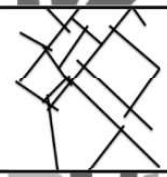
VIENNA	1858 VIENNA (Source: London, John Murray)	1905 VIENNA (Source: Meyers Konversatns-Lexikon)	1926 VIENNA (Source: Baedeker's Austria)	SCHEMATIC FIGURE OF THE URBAN SPACE and SPACE SYNTAX	TYPE
Kaiserstraße and surrounding					Symmetrical diagonals with rectangular blocks and 'estuary' square (widened street) at the end of the Kaiserstraße, the exponated façade of the block ending in a triangular plot
	closed built-in type, geometric plots, diagonal street pattern, wide streets/variable hierarchy	variety in the block shapes, expanded street 'estuary' formed square (widened street for public transport)	variety in the block shapes, expanded street 'estuary' formed square (widened street for public transport)		
Westbahnhof and surrounding					The square was built at the fork of roads, near to the railway. A façade is the railway, the unity of the square is broken by wedged blocks. Twin-like
	Large unbuilt area, closed blocks, and irregular spot building location	dense, regular built-in type, the central square was created at the junction of the roads, funnelform	Variety in the block size and geometry, the square widens, and blocks break the unity		
Jägerstraße and surrounding					The square is created at the junction of the roads, unique form, and one of its facade is the railway, non-closed, irregular form
	Easily, loosely built-in type, the green area and hydrography dominate, closed built-in type.	The dominance of the railway changed the spatial structure, wide roads and squares	The built-up is getting thicker and thicker, the directions determined by the topography,		
Wien Praterstern and surrounding					The classical establishment of the square, typically thematic square form, the square of crossroads: the cut of the corner of the streets increases the specific characteristics for the town.
	The square of crossroads, the radial roads intersect at one point: extension	The extension is a modal junction, regular, central circle, and star-shaped, half symmetry	Half symmetry: modal junction, harmonic green, built-up density and and transport scale		

Figure 3. Typo-morphological analysis of selected areas - case study: Prague

PRAGUE	1858: MAP of PRAGUE (Source: John Murray, London)	1880: MAP of PRAGUE (Source: Brockhaus, Leipzig)	Around 1900: PRAGUE (Source: Myers Kony Lexicon)	SCHEMATIC FIGURE OF THE URBAN SPACE and SPACE SYNTAX	TYPE
Florenc station and surrounding					Curvilinear modified diagonals, multiple grid orientations, the modal center is in the focus, the square is morphologically identified, but it does not only function as a square (green areas)
	Irregular town layout within the town walls, unbuilt areas	Intensive development due to the railway station and the public transport	Railway station, irregular square shape, unbuilt areas, liberated square from buildings		
Nám. Republiky and surrounding					Irregular street pattern and square shape, the public transport did not change the pattern of the streets and the structural pattern of the roads, the central block partly closes the square
	The relic of the medieval urban fabric , irregular road network and blocks	The hierarchy and blocks of different transport, public transport at the widening square	Widening, irregular square shape, partly the splay of the street and the encounter of the junctions		
Wenceslas Square and surrounding					Symmetrical diagonals with rectangular blocks and 'released' square, the square is the result of the widening of the street, equal transport
	The historical form of the square and the street, boulevard, with a significant endpoint, the streets are irregular	The tram goes through the square, at the endpoint connects to the intersecting street , no structural change	The tram goes through the square, at the endpoint connects to the intersecting street, there is no structural change		
Arbesovo Nám. and surrounding					Topographically influenced curvilinear diagonals, prolonged, soft triangular and rectangular blocks and square, multiple grid orientations
	loose urban layout, Topographically influenced curvilinear diagonals	high variety in the block shapes, central area with planned green spaces and widened roads for trams	high variety in the block shapes, central area with planned green spaces and harmonic square-street communication		

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as well as the urbanization of the suburban areas, how these approached the central territories. The train stations incorporated with the urban tissue densification around them indicated the establishment of the new sub - centres presenting a different, more diagonal/planned spatial plan. The morphological schemas of the studied non – built – areas partially can be defined by the archetypes of spaces/squares - streets systems, but in our case it should be considered that the open spaces at the intersection of the streets which are morphologically squares, but functioning as a public transport hub. The urban tissue types are observed and defined by a street - space – form- hierarchy based method, the results and the urban schemas function as a basis for further research: especially in case of the Hungarian towns between 1867 and 1918, the urban fabric, morphological characteristics, underlying principles became identifiable by following the research methodology and determination of the development forces.

References

Bónis Gy. (1980) *Budapest története IV*. (Akadémiai Kiadó, Budapest)
Granasztói, P. (1960) *Város és építészet* (Műszaki Könyvkiadó, Budapest)
Legát, T.; Zsolt L. Nagy; G. Zs. (2010) '*Számos villamos*'. Budapest: *Jószöveg*. pp. 6–12.
Kohonut, J. And Vancura, J. (1986) Praha 19. a 20. století (Vydalo SNTL, Prague)
Vienna am Anfang des XX. Jahrhunderts. *Ein Führer in technischer und künstlerischer Richtung* (hg. v. Öst. Ingenieur- und Architektenverein) (1905) Vienna, Bd. 1, S. 161-185 (http://library.si.edu/digital-library/book/Viennaamanfangdesx01kort) accessed 25 April 2015.
Vienna, Stadtbauamtsdirektion (1935) *Festschrift herausgegeben anläßlich der Hundertjahrfeier des Viennaer Stadtbauamtes am 12. Mai 1935 von der Technikerschaft des Viennaer Stadtbauamtes und der großen Technischen Unternehmungen der Stadt Vienna,* (Dt. Verl. für Jugend u. Volk, Vienna
Maps and archive materials:
Budapest: Pest és Buda belterületének várostérképe 1854, Budapest közigazgatási térképsorozata 1895, Budapest kataszteri térépsorozata utólagos bejegyzésekkel 1912, layers provided by Arcanum Adatbázis Kft, data provided by Budapest Főváros Levéltára, Georeference method: Timár, G., Biszak, S. (2007): Budapest 1938 előtti nagyméretarányú topográfiai térképeinek georeferálása. *Geodézia és Kartográfia* 59(8-9): 47-51.
Vienna: 1858 Map of Vienna (John Murray, London) from a Handbook for Travellers in Southern Germany, Eighth Edition. London: John Murray. 1858. (http://www.reisenett.no/) accessed 10 May 2015., 1905: Stadtplan von Vienna innerhalb des Gürtels, Beilage zum Meyers Konversatns-Lexikon 6., Bibliographisches Institut Leipzig, Vienna-1929 - City Map - Baedeker's Austria
Prague: 1858 Map of Prague (John Murray, London) from a Handbook for Travellers in Southern Germany, Eighth Edition. London: John Murray. 1858. (http://www.reisenett.no/) accessed 10 May 2015. 1880: Map of Prague (Brockhaus, Leipzig), colour street map of the city of Prague from Myers Kony Lexicon, circa 1900, published by the Bibliographical Institute of Leipzig.
Other:
Conzen, M.R.G., ed. Conzen, M.P. (2004) *Thinking About Urban Form Papers On Urban Morphology 1932-1998*. (Peter Lang Publishing, Bern) Gutkind, E. A. ed. (1972) *Urban development in east-central Europe: Poland, Czechoslovakia and Hungary. In: International history of city development*; vol.7. (Free Press, New York/London)
Kostof , S. (1991) *The city shaped: urban patterns and meanings through history.* (Thames and Hudson, London)
Kropf, K. (1996) 'Urban tissue and the character of towns', Urban Design International, 1(3), 247–263.
Meggyesi, T (2009) *Városépítészeti alaktan* (Terc, Budapest)

Chair_Karl Kropf
Oxford Brookes University and Built Form Resource Ltd., United Kingdom
Co-Chair_Pina Ciotoli
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Knots
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Typological Process

Urban Growth

A case for the mezzanine: guidelines for vertical additions above Montreal's tenements

François Dufaux
École d'architecture, Université Laval, 1, côte de la Fabrique, Québec, G1R 3V6, Canada
Keywords: Montreal, tenement, by-laws, transformation, mezzanine roof-top terrace

Abstract

Municipal by-laws frame the transformation of a city, yet their hold on the actual evolution of the built form lies in an imperfect relationship with the market forces. Too strict rules remain words in front of private demands and investments; too permissive ones extend the offer beyond demand and dilute the opportunities for strategic development. The study presents the impact of the current by-laws regulations on the addition of a mezzanine floor above conventional tenements at the urban and building scales in Montreal. The building code and municipal by-laws offer some options for additional living space above existing tenements. A mezzanine, up to 40% of the dwelling below, may be built without built being an additional floor. Montreal's master plan (1997) and the Plateau Mont-Royal borough architectural regulation guidelines (2005), based on a morphological analysis of the built environment, temper these potential rights.

The study is two-folds. At the urban scale, it reviews the building guidelines and the impact of additional floor and mezzanine on the potential growth of living spaces, roof-terrace garden and green space. At the building scale, 12 students projects highlight the potential impact on the residential premises and the evolution of the housing type. Presented at the borough's administration, theses preliminary results triggered ambivalent reactions. Architects dealing with building permit requests welcomed the potential guidelines while Planners feared the controversy of allowing changes of the current built landscape. How much the city remains a project built for change?

Introduction

The paper presents the research and outcomes of a master's level design studio at Laval University's School of Architecture that focused on the connections between construction regulations and building design. The studio targeted three main objectives. First, to bring students to develop a high degree of construction and architectural detailing, common in professional practice but unusual in the academic training. Second, to confront them with the normative framework of the municipal bylaws and the building code, and to discover the design options offered beyond such guidelines, notably at the finest scale of the construction detailing. Finally, as a studio team, students were invited to implement a morphological analysis of the housing types and the current regulations in order to develop a critical understanding of the legal framework guiding the building design.

The Design Studio's Objectives

The students were invited to deal with mezzanines at two scales. First, they work in groups of four to explore the relationship between the built form and the regulations at the borough scale. The borough was divided in four districts: Mile-End, De Lorimier, St-Jean-Baptiste, Milton Parc. This provided within the first six weeks an overall understanding of the potential market for new mezzanines and the different legal constraints framing its design and construction. Second, each student was given access to a complete set of plans of one tenement. The following eight weeks were devoted to the design of a mezzanine. After one month, student presented a first set of drawings similar to the one to be submitted to the local planning advisory committee. The final review required a second set of construction drawings comparable to the ones submitted for a builder's quote and the building permit.

The end-of-term studio results were presented to the borough's administration with a mixed reception. This exercise underlined that cognitive tools, as provided by morphological analysis, offered strong arguments for a finer planning framework appreciated by the architects involved in the Building permits department. However, the planners and councillors, yet pleased by the results, could not integrate such a proposal within their current agenda.

Mezzanine design in Montreal: a rising agenda

An imaginative interpretation of a regulation

The National Building Code of Canada (NBC) defines the mezzanine as an additional floor space with an area of less than 40% of the floor below. Within this 40%, the mezzanine area is not considered an additional floor by the zoning bylaws enforced by municipalities. This offers a «free» fourth level to a building that is still considered within the three-floor maximum of the zoning bylaws. The NBC's original allowance of mezzanines was to accommodate office mezzanines within a double height factory space. This is now reinterpreted in residential applications where the mezzanine space is required to have a floor opening between the lower and upper levels.

Montreal's typical tenement buildings are between two and three storeys, with one, or sometimes two, flats per floor with a flat roof. At the building scale, a mezzanine represents a marginal increase between 13 and 20% of additional built space. However, for the last floor dwelling(s), this offers 40% more interior living space. As most dwellings cover between 60 and 100 m2, the mezzanine implies an additional space of between 24 to 40 m2.

This building opportunity gradually became more popular as a tenement building's values increased in the past twenty years. The mezzanine offers an open-plan interior and an exterior living space on the adjacent roof, in contrast with the traditional subdivided interior flat layout. It answers a new lifestyle that tries to blend the best of urban living – services, views, social encounters – with the privacy of suburban values represented by a private terrace under the sun.

Design within the legal framework:

The Building Code and municipal regulations

Projects for a mezzanine submitted for a building permit in Montreal have to meet three levels of legal requirements. First, the National Building Code of Canada (NBC) sets rules regarding the building access and egress, the walls' fire resistance and the above-mentioned definition of the mezzanine. Secondly, Montreal's planning documents edict the zoning Bylaws. These define the building development rights and the dwellings' spatial requirements. Finally, the borough issues a building permit following the conformity of the two previous rulings and the approval of a local Planning Advisory Committee (CCU).

The NBC was first published in 1941 and edited since 1947 by a federal Institute for Research in Construction. The National Building Code partly derives from Montreal's own Building Code published initially in 1900, incidentally named Code 1900. This original regulation largely formalised the building tradition developed during by the end of the 19th century in then, by far, the largest Canadian city. Where the NBC requires the provision of two exterior accesses for each dwelling as fire escape and security, Code 1900 insured the provision of two exterior accesses, one to the street and the other to the courtyard, for convenience and social practice.

The Municipal regulations added two types of requirements completing the NBC's normative ruling. On the construction itself, they amended some aspects in order to fit with the built environment; it required fireproof materials – masonry and metal – as external finishes. It allowed winding external staircases, both in the front and rear access to upper floor flats. Second, the Zoning Bylaws defined the land use, the number of dwelling units per land plot, the building coverage and height. While municipal bylaws may be advocated as safeguards for minimum living standard under the concept of the density, the local regulation influences above all the land economic value in relationship to its development potential.

The Building Code and Zoning Bylaws are legal documents. On one side, they outline a legal framework defining the envisioned built environment. On the other side, they amalgamate historical traditions with later additions introduced to foster improvement to existing rules. This imperfect relationship between the ideal of the intended framework, the traditions and addenda, create opportunities for interpretation where architects develop new design solutions. The residential mezzanines provide an ideal case study.

The Planning Advisory Council

The borough administration is responsible for applying the municipal regulations before issuing the building permit. It further assesses the project's architectural integration using a "built environment character study" prepared between 2004 and 2006. This study outlines some common features share by areas within the borough's limits. A typo-morphological inspired method outlines some architectural characteristics to preserve or adopt, yet within a preservationist perspective.

The borough Planning Advisory Committee (CCU) is the most recent regulator since 2005. Local borough council members are joined with citizens and professionals. Together they review projects submitted before the building permit, in order to confirm the design proposal or suggest improvements.

The Urban Analysis

The purpose of the urban analyse was twofold. For the students, it was the necessary step in order to deal with the conventional building regulations so often lightly addressed in academic design projects. For the tutor, it was an opportunity to test these different rules – the Building Code, the Zoning Bylaws, the morphological characterisation – on selected districts of the borough. A perfect fit between bylaws and the built environment suggests a strong planning control and expectations about would be submitted and eventually built.

The Architectural Integration: The Insertion Rule

The planning documents produced in 1995 set a citywide rule on the "architectural in-

sertion". This rule states that regardless of the zoning bylaw's maximum height, a building should conform to the number of storeys of at least one of the immediate neighbouring properties. Corner sites are allowed to avoid this rule. The main argument for "architectural insertion" is to respect of the overall character of each streetscape. This assumption derives from the claim that tenements, partly inspired by British terrace design, were relatively homogenous on street sections in height and number of storeys.

The analysis of the Mile End District in the Plateau Mont-Royal borough provided observations contesting this assumption. Among the 612 building surveyed, the potential for an additional storey depended on the combination of the maximum number of floors (3-storeys-86%; 4 storeys-14%) and the provision of a taller neighbouring building. Among the three-storeys area, 51% of the building fit the maximum height, 54% are on one- or two-storeys which could represent 286 buildings and potentially 345 additional floors. The application of the "insertion rule" reduces this possibility to 139 buildings (23%) and 169 additional floors. This means that one building over four is not the same height as at least one of its neighbours, which contradict the expectation of a homogeneous streetscape in terms of an equal number of floors among buildings. The four-storey area, only 6 buildings over 85 matched the maximum height, leaving 79 building from one to three storeys high and potentially 103 additional floors. Likewise, the "insertion rule" cut by half the number of potential additional floors.

The students estimated that the number of additional floors was limited to 8% in the district analysed with the "insertion rule". This result increases to 25% by only respecting the bylaw maximum number of storeys. As one additional floor usually equals one additional flat, the removal of the "insertion rule" at the borough's scale could increase from 568 units to 2928 units.

The underlying objective of the "insertion rule" was to preserve the architectural character and fabric of its original building typology. The emphasis put on a homogenous building height has neither historical foundation nor morphological logic. It imposed an arbitrary condition, in favour of some property, next to a taller one, and discriminate others. Yet, it does not provide architectural and construction criteria that would actually address the design integration of an additional floor and mezzanine.

The Building Height

The current municipal bylaw on the building height derives from a previous regulation. The most common rule is that building should be between two and three storeys. The common maximum height of 12,5 m is a translation of 41 feet established by Code 1900. This figure is the sum of a typical 1900's three-floor tenement (3x3m/3x10'), a foundation (1,2m/4'), the flat roof structure (1m/3') and a marginal extra space (1,2m/4'). The addition of a mezzanine becomes an opportunity under two conditions. First tenements were only two storeys high. Second, three-floor tenements had floor and foundation heights lower than the expected 1900's standards; as the marginal extra space (1,2m) is half the minimum height for a mezzanine structure.

The NBC, on the other hand, allows wood construction up to four storeys and states that a ground floor may be up to 1,8 meter (6') above the street level, thus making a half basement a better living space. A three storeys' building, taking advantage of the NBC rules, is likely to reach 14m, with a half-basement, three storeys and a mezzanine. The heights between the Montreal's rules and the Canadian ones do not match in a consistent proposal.

In a survey of 120 buildings with a maximum height of 3 storeys and 12,5m: 16 were two storeys and 104 were three storeys. The average height was 10,7m and the median 11m with a standard deviation of 1,71m. The space clearance available for a mezzanine was in average 2,28m, yet the median clearance only 1,48m. This reduces the potential for mezzanine addition. In fact, only 19 buildings (16%) were less than 10m high where one could insert a mezzanine within the 12,5m maximum height.

The analysis of another district of the borough estimated, from a 10% building sample, that 37% of the building could add a mezzanine within the 12,5m limit. This could likely represent about 6,350 additions at the borough scale.

Until 2008, the building height was set in relationship to the highest neighbouring prop-

erties plus one metre. The insertion of a mezzanine could use an extra two metres to the building's total height, on a conditional setback twice the mezzanine height. The students explored the impact of allowing an extra metre that could increase the clearance for mezzanine at 13,5m.

This meant a marginal height increase of 8% (1m/12,5m). However, the number of estimated potential mezzanines jumped by 216% up to 18 000 additions for the entire boroughs. The 12,5m limit entitled a little more than 1/3 of the properties to build a mezzanine; the 13,5m extended this opportunity to 80% of the buildings.

The environmental impact; street width and plot depth

Another team surveyed the Mile End District, in the northwest section of the borough. Building regulations stated six maximum heights covering shares of the area: 9m (1,2%), 11m (8,7%), 12,5m (66%), 14m (15%), 16m (2,6%) and 20m (8,4%). The areas above 14m covered industrial and institutional sections.

The students measured the distance between street façades, and the plot depth in order to assess such impacts. The distances between the façades ranged from 10 to 35m with no clear correlation with the maximum building height (10m to 15m-7%; 15m to 20m-39%; 20m to 25m-22%; 25m to 30m-23%; 30m to 35m-9%). One section, where the distances were between 10m to 15m (7%), covered the section where buildings were 9m high (1,2%) in the borough. The spatial distribution of the façade distance told us more about the land use. The commercial streets were 14 to 16 m high regardless of the façade distance. On the other hand, the largest distance between façade indicates the "better streets" where middle-class tenements and apartment buildings were built.

The depth of building plots ranges from 10m to 30m. Most properties were set on plots of 15m to 20m (17%), 20m to 25m (47%) and 25m to 30m (26%). Plots shorter than 15m (7%) and above 30m (3%) were marginal and resulted from subdivisions or amalgamations. The plots' depth, in between 15m to 30m, were designed with a different segment of the housing market in terms of dwellings' size, material and finished. Still, tenements of two or three storeys were intended for all plots. In a detailed sample of 612 buildings (13% of the Mile End District), buildings range from 1 to 4 storeys with a clear prevalence of two and three-storey structures (1 storey-10%; 2 storeys-31%; 3 storeys-53%; 4 storeys-6%).

The discussion around the impact of additional mezzanines may easily allude to their environmental impact on light or shadows on neighbouring façades and gardens. Indeed, classical planning guidelines relate street width and building height in order to preserve the provision of light and fresh air. The analysis of the Mile End District shows that such an argument is "morphologically" marginal; with or without a mezzanine, buildings are smaller than 14m high, when street width and plot depth are above 15m in 93% and 90% of the time respectively.

The unsuspected outcome; green space coverage

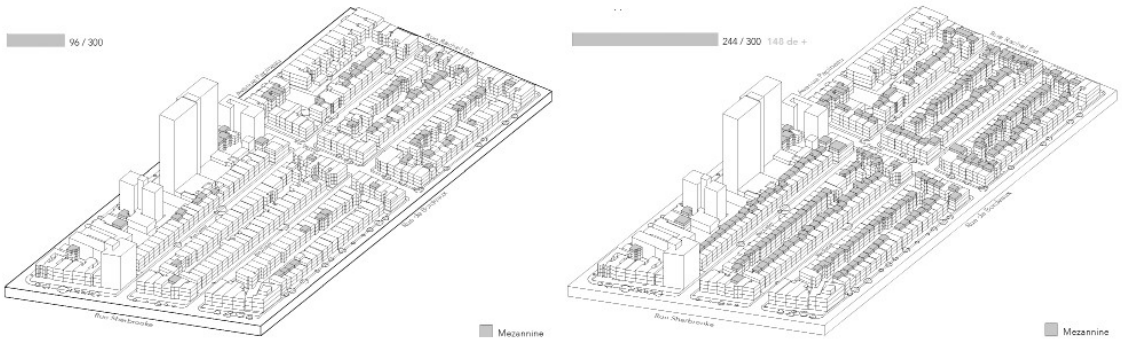
Another group of students analysed De Lorimier Districts where again they confirmed the impact of the maximum height allowance. At 12,5m, 32% of the building could have a mezzanine, at 13,5m, 81% would have the same opportunity. At the borough's scale, this could make the difference between 8200 and 18150 mezzanines.

As a mezzanine could only cover 40% of the roof, they assumed that a wood roof terrace for outdoor activities would cover a similar area, leaving a minimum of 20% for a green roof. More mezzanines directly increase the green space coverage; at 12,5m it could mean 7,2 hectares, at 13,5m: 15,6 hectares. At the district scale, the public green spaces account for 21,6 hectares or 10,4% of the area. The additional green spaces next to the terraces and mezzanines would enlarge the green coverage by 7,6%, which may have a beneficial environmental impact on water drainage and reduce urban heat islands.

Municipal regulations; between long-term rules and short-term accommodation

The individual student proposals for a mezzanine explored and revealed several other findings at the building scale. Some addressed the dwelling's configuration and pro-

Figure 1-2. Within the same section of De Lorimier District, the potential of mezzanines at 12,5m is 96 units. It increase to 244 units at 13,5m maximum building height



gramme. The additional living space, often devoted to a living space such as a kitchen and dining room connected to the terrace, views and sun, opened an opportunity for improving the existing flat's layout. Notably was the addition of a third or fourth bedroom, which could better suit family expectations.

The composition of the mezzanine volume and the parapet, to reduce the visual impact provided a design opportunity to explore the nature of architectural integration with the existing façade. The construction, by dealing with the structural nature of the existing building and the regulation requirements, explored multiple technical and material solutions that lead students to deal with the detailing of tectonics so rarely reached in academic training.

Presentation to the Borough

The results, at the urban and building scales, were formally presented to the Plateau Mont-Royal borough, with the mayor and council members, planners and architects attending. The overall reception was positive; the academic exercise provided factual information, both unknown and practical, making a case for morphological analysis and design method.

The civil servants in charge of delivering the building permits saw a draft potential guidelines for owners, architects and builders that often submit unsatisfactory proposals at first. They also saw a method to foresee the maintenance or increase in the number of dwellings, yet also a contribution for the improvement of living standards and design proposals.

The councillors' and planners' reactions were more cautious. Because they respectively vote and implement regulations they remain sensitive to residents' reactions. Beyond the planning and architectural findings, they were concerned by the political weight of neighbours' complaints, regardless of their basis between a measured environmental impact or a "not-in-my-backyard" reaction. Currently, a mezzanine approval goes through the Planning Advisory Committee (CCU) that provides room for direct negotiations. Would the guidelines endorsed by the borough architects reduced the discussion and be interpreted as a green light for "densification"?

The construction of additional living space, and notably mezzanines, remains relatively expensive. Councillors associated housing improvements with gentrification. The short-term impacts of new vertical additions of new floors and/or mezzanines, whether social, economic or political weighed more than the long-term planning contribution. Architecture remains seen as part of the problem and not part of the solution.

References

Conseil national de recherches du Canada (2015) *Code national du bâtiment du Canada*
Patri-Arch (2003) *Étude de caractérisation du Plateau Mont-Royal*, Ville de Montreal, Arrondissement du Plateau-Mont-Royal, Direction de l'aménagement urbain et des services aux entreprises,
Rasmussen, Steen Eiler (1937) *London, the unique city*; New York : The Macmillan Co
Ville de Montréal (2005) *Plan d'urbanisme, secteur Plateau-Mont-Royal*

The houses of two realms

Décio Rigatti
UniRitter – Laureate International Universities, Porto Alegre - Brazil
Keywords: rural domestic space; Italian immigration in Brazil; rural housing morphology; liminality and space

Abstract

During the late quarter of the XIXth century, Italian immigrants occupy a still vacant part of the territory of the Rio Grande do Sul State in Brazil. In another work an analysis of the structure of a sample of twenty one old rural houses was made. Using space syntax techniques, some genotypes were identified and described. The houses could be assigned to two main genotypes: the first one is the tree-like structure, with the living room as the central space of the composition with only one door connecting the exterior space to the rest of the house. This genotype allows a more strict control over space and is more suited for patriarchal families as they were; the second genotype could be described as a more ringy structure, with the living room as the connecting space between the private and the service parts of the houses. The multiplicity of entrances from the exterior space produces a more open and shallow structure and could be considered less suited to a patriarchal family. The main goal of this paper is to analyse the sample of houses from a different point of view: comparing what changes in the genotypes when the door connecting the exterior space to the living room the space used as a place of representation for strangers is open in rites of passage and when it is kept closed, which happens most of the time in the daily life of the families. The first results show that when the door connecting the exterior space to the living room is closed the overall structure of the houses tend to become tree-like allowing a rigid control of the family life. When this door is kept open on liminal occasions, the structure is shallower, ringy and open and the control over the spaces is less unitary.

Introduction: space, daily life, liminality and patriarchy

The first Italian immigrants start occupying part of the territory of Rio Grande do Sul State in south Brazil, from 1875 onwards in a hilly land which was subdivided by a quite rigid and geometric design in rural plots of about ten hectares, which produces a relatively dense occupation for a rural settlement.

The community life took place around churches and chapels and, occasionally, in the family houses. Religious unity provided support for a collective life in a strange land, mainly through religious celebrations and festivities. Important part of the sociality took place in the houses themselves, especially on liminal events like births, engagements, marriages and funerals when the houses were open for the contact with strangers, aiming not only to share the celebrations or mourning but also as an important way of transmission and control of the social life as a whole.

The opening of the houses on these occasions corresponds to a moment when the usual daily order and the pre-existing control structure are blurred (Turner, V., 1969), temporarily rearranging the space. When the rite of passage is over, the space returns to its former and daily structure. The way Italian immigrants in Brazil used do structure their domestic space allowed to control the social use of the space on rites of passage and return it to the family life, which was strongly based on a patriarchal system, requiring the control of the space itself in order to be effective.

The structure of the domestic space requires specific attributes to ensure that the space can be an instrument of the control and authority of the patriarch, who rules the family with an almost absolute power over the family.

Accesses to/from the exterior and the internal spatial relations are used to produce and reinforce the family organization, the relative position of their members, the relations with strangers and how the entire relations on space are controlled by the master of the house.

Based on these premises, the goal of the paper is to investigate how the houses of the first Italian immigrants in south Brazil are structured for the daily life and for rites of passage as well, analysing what and how they change depending on different situations of the life of the families throughout time.

Methodology

A sample of thirteen houses presenting doors directly linking the living room to the exterior space and belonging to the first period of the Italian immigration in the rural area of the municipality of Bento Gonçalves were selected to evaluate the differences between their structures considering the door open – usually on rites of passage – and with this door closed, which happens most of the time. For both situations and over the plans of the houses, together with the labels of the rooms, space syntax techniques were used producing graphs and integration values for every room of every house of the sample. Results are, then compared and analysed and the genotypes that emerge from both situations are identified and their meaning analysed.

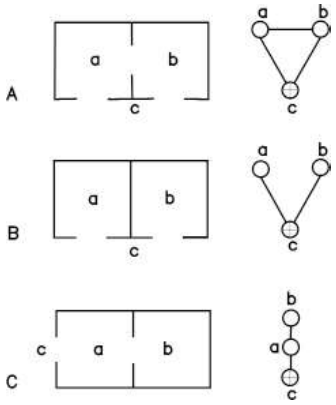
Space Syntax techniques - The morphology of the houses, which is "…the pattern of adjacencies and connections between rooms within a dwelling" (Shoul, M. 1993, p.24), is analysed through their plans. Justified graphs were made taking every room of every house as the root of the graph. Integration values of every room and house were then calculated and the rooms were ranked by order of integration. These procedures allow us to evaluate the structure of the houses beyond their shape, materials and so on.

In the example below (figure 1) plans is showed in the left, and the correspondent graphs in the right.

Spaces 'a' and 'b' are someway related to the exterior space 'c', and the role of each space depends on its relative position regarding all others and the different plans showed in the figure mean differentiations in the ways all spaces control all others and, therefore, represent different ways of controlling social relations.

By analysing a number of buildings using this technique it is possible to identify families of structures – or genotypes – and these genotypes will allow verifying how Italian immi-

Figure 1. Plans and respective graphs. From: Hillier and Hanson (1984, p.148)



grants structure their houses in Brazil. These genotypes will enable us to link morphology and social use of space.

> "...a genotype in buildings (gamma, in the original) can be defined in terms of as sociations between labels of spaces and differentiations in how those spaces re late to the complex as a whole... (...) genotypes will be the result of relations of inhabitants with inhabitants and inhabitants with visitors" (Hiller and Hanson, 1984, p.154).

Integration will be the only the measure utilized here to describe the structural proprieties of house layouts once it makes it possible to identify the role of every room in a building regarding all others. Integration is a function of depth from every space to all others and depth is the number of rooms needed, from every room, to reach every other one in the building.

The labels of the rooms – How rooms are occupied is important to understand the logic of space organization and its relations to social behaviour in space. Regularities or differences presented in a group of buildings can define families of structures or genotypes. As Julienne Hanson says:

"Function thus acquired a spatial expression which could also be assigned a numerical value. Where these numerical differences were in a consistent order across a sample of plans from a region, society or ethnic grouping, then we could say that a cultural pattern existed, one which could be detected in the configuration itself rather than in the way in which it was interpreted by minds (Hanson, 1998, p.32).

Hanson, J. calls this numerical consistency as house genotype and in this paper the analysis is made for two different situations: keeping the connection between inside/ outside the houses through the living room open and closed.

Main features of the rural houses of the first Italian immigrants in south Brazil

The house of the Italian immigrants is not only the core of the family but is also part of a complex organization. Differently to what used to be the rural houses in northern Italy in mid XIXth century, where a single building concentrates almost all roles, from shelter the family to the production activities, the care with animals and the storage needed throughout the year both for the family and animals (Migliorini, E. and Cucagna, A., 1969; Barbieri, G., 1962), in Brazil, the main functions are held in different buildings.

The houses have also an important role as a place of representation, mainly for strangers and neighbours.

The house is organized in different parts: a) the service area, usually consisting of a dining room and a kitchen. The dining room is utilized throughout the day, especially for the members of the family responsible for the housekeeping. The kitchen is where the entire family is gathered together, especially in the cold nights working as an important space for social interchanges, for discussing family issues and to organize the work. The access to this area is usually made by an independent door from the exterior space. Therefore,

there is no need to pass through other spaces in the house. Usually this part is built as a different volume from the rest of the house, which is connected through a passageway, when the volumes are separated, or through a doorway, when the volumes are juxtaposed. This works as a security strategy, once the kitchen is more exposed to fire accidents; b) a private area, usually consisting of bed rooms and a living room, the less used place of the entire house and where strangers or more formal visitors are received. The living room is the connecting space for the bed rooms, which are separated according to gender and age and small children are often together or close to the parents. Also this part of the house is usually directly connected to both the exterior space and to the service area of the house. In spite of little use in the family daily life, the living room works as a representation space for strangers in rites of passage. It is a fundamental space for social relations between the family and strangers; a symbolic space mainly for visitors where the best furniture, the tidiest part of the house can be showed off; c) the cellar is usually built of stones and with a small number of windows and doors. The control of building materials and openings to the exterior space ensures that the internal temperature is kept low and constant, a strategy to preserve and store part of the food production of the family, like cheese, salamis, wine, potato and seeds. As a natural fridge, the cellar represents a key space for the sustenance of the family; d) the attic has a similar feature for the functioning of the house. Because it is submitted to high temperatures and low levels of humidity, it is used for storing grains (granaro) like wheat, and corn and nuts (*ogliessa*).

The Syntactic properties of the houses

The figure 2 presents the plans of the houses of the sample, the base to measure the integration values of every room and the mean integration value of each house (Hanson, J., 2003:28).

This procedure was made for two different situations: a) considering the houses with the connection between the living room and the exterior space closed, which is as they work most of the time; b) considering the door connecting the living room to the exterior space open, which happens on rites of passage. It is possible, then, to compare and rank the order of integration of the rooms and houses in both situations. Table 1 shows the results for the sample.

When the door linking the living room to the exterior is closed the mean depth of most of the houses increases and, therefore, decreases the mean integration values. From the point of view of the order of integration of the rooms in every house, with and without the living room connecting to the exterior space, it is possible to verify not only how the rooms keep or change their roles in the structure of the houses but, and more importantly, how the spatial control within the houses change and is able to generate different house genotypes.

Table 2 presents the order of integration of the rooms of the houses with the door linking the exterior space to the living room open, representing how the houses are perceived during rites of passage, meaning particularly how the houses and the families relate to strangers. The table is presented only until eleven steps of integration and the analysis will be made until step four in order to condense the argument.

In this case, the living room, the space responsible for receiving strangers is the most integrated space in 65% of the houses. In the remaining 35% of the cases, the most integrated spaces are more private spaces like the attic living room, dining room, corridor and the cellar. The second most integrated space – almost 50% of the cases - is shared by rooms responsible for the transitions between exterior/interior like porches, roofed corridors and the exterior space itself. The other part of the rooms in this step includes spaces responsible for the internal control of the houses, like the attic living room. Also in this step are the dining room and the kitchen, which are particularly important for the life of the family and not as relational spaces to strangers. In the third step of integration, the exterior space becomes more important as well as the parents' bed rooms, located in the ground floor, meaning that they are shallower in the structure of the house and, therefore, it is easier for them to control the entire house and the members of the family as well.

In the fourth step, almost all rooms are prioritized for the family life, like the attic living

Figure 2. The Plans of the Houses

room, the kitchen, the bed rooms, the cellar and the attic. Integration tends to be concentrated in spaces responsible for the transitions between exterior and the living room. This kind of spatial organization allows that rites of passage can be spatially mediated by the living room with no need to use the rest of the house for the interaction of the family with strangers, keeping the relations between the inside and the outside in a shallower and controlled structure. This layout solution does not jeopardize the private life of the family, because more private spaces like the bed rooms are always deeper in the composition.

In the case when the door connecting the exterior to the living room is closed, which corresponds to the daily life of the family, the results in the order of integration of the rooms of the houses can be observed in the table 3, and the analysis is made until step 5, where all houses present rooms.

In this situation, also the living room is the most integrated spaces in about 57% of the cases and the rooms that are related to the family life like the attic living room, the dining room, bed rooms and cellar are the most integrated spaces in the remaining 43% of the cases. In the second level of integration, the spaces responsible for gathering together

Table 1. Integration Measures and Order of Integration of the Houses with the Door Connecting the Living Room to the Exterior Space Open and Closed

House	With the door open		With the door closed	
	Mean integration	Order of integration	Mean integration	Order of integration
Arsego House	1.133133	2	1.022283	2
Comiotto House	1.096388	3	1.020000	3
Destro House	0.805437	13	0.715172	11
Gabardo House	1.011290	6	0.950000	4
House of the Pasta	0.924209	10	0.785081	10
Merlim House	0.971452	9	0.612000	13
Moret House	0.813128	12	0.650571	12
Rossato House – Eulalia Alta	1.001455	7	0.949655	5
Simadon House	0.832125	11	0.832125	8
Somensi House – in the Valley	1.028345	4	0.839224	7
Somensi Larentis House	1.330000	1	1.168696	1
Toniollo House	0.999722	8	0.811709	9
Zachet House	1.024154	5	0.907773	6

the family like the attic living room, the kitchen and the dining room and spaces that organizes the internal structure of the houses like corridors respond for more than 92% of the cases. In the third level of integration there is a balance between spaces related to the family life, and spaces that are responsible for the relations with strangers. The more private spaces like the attic living room, the dining room, the kitchen, the attic corridor and bed rooms respond for 61% of the cases, while the living room, the porch ant the exterior respond for the rest of the cases. In the fourth and fifth levels there are spaces that represent opposite roles in the structure of the houses: the exterior space, which has a broader use, and the bed rooms that are meant for the exclusive use of the family. In this case, the whole house becomes more introverted and the relationship between space organization and the daily life of the family is prioritized through the house layout and the possibility of interactions with strangers diminishes. This configurational feature reinforces the internal control over the family and the ruling of the house is spatially supported by the way the configuration is adjusted.

The structure of the houses – the genotypes

The structure of the houses is evaluated by the graphs from the point of view of the living room, the most integrated space, with and without the permeability with the exterior.

Welcome to strangers - When the living room is directly connected to the exterior there is at least one ring which always contains the exterior space, usually linking it with the living room, the kitchen or the dining room (figure 3).

The exterior is a mediator space not only regarding the living room, where strangers are admitted into the houses, but also represents an independent access to the service part of the houses. Inhabitants can move from the exterior directly to the service or the social part of the house. On special occasions, the social and service parts can be used separately and, in the daily-life the private part of the house can be kept neat and ready for the arrival of strangers. The graphs also show that the bedrooms are always the deepest spaces in the houses, strategically located to cluster the family members away from the scrutiny of strangers.

All houses can be assigned to only one genotype that governs the configuration meaning that all houses work basically in the same way: there is at least one ring of movement, connecting the exterior space, the service and the private parts of the houses through the living room; the living room organizes and controls the private part of the houses, which present a tree-like structure; the living room connects different parts of the houses.

The daily life of the family - When the door connecting the exterior space to the living room is closed, the entire configuration changes, resulting in a more tree-like structure, as can be observed in figure 4.

The living room keeps its role as the connecting space between the private and ser-

Table 2. Order of Integration of the Rooms of the Houses with the Exterior Space Connected to the Living Room

	ORDER OF INTEGRATION										
HOUSE	1	2	3	4	5	6	7	8	9	10	11
ARSEGO HOUSE	ATTIC LIVING ROOM	LIVING ROOM	PORCH	CELLAR	EXTERIOR						
				KITCHEN							
				BED ROOM 1							
				BED ROOM 2							
				BED ROOM 3							
				BED ROOM 4							
				BED ROOM 5							
				BED ROOM 6							
COMIOTO HOUSE	LIVING ROOM	DINING ROOM	PORCH	BED ROOM 1	EXTERIOR	KITCHEN	CELLAR A				
		ATTIC LIVING ROOM		BED ROOM 2		BED ROOM 6	CELLAR B				
				BED ROOM 3		BED ROOM 7					
				BED ROOM 4		BED ROOM 8					
				BED ROOM 5		BED ROOM 9					
DESTRO HOUSE	DINING ROOM	PORCH	LIVING ROOM	KITCHEN	EXTERIOR	ATTIC LIVING ROOM	CELLAR	BLACKSMITH/CELLAR	CARPENTRY	BED ROOM 4	BLACKSMITH STORAGE
					BED ROOM 1		LARDER			BED ROOM 5	
					BED ROOM 2					ATTIC	
					BED ROOM 3						
GABARDO HOUSE	LIVING ROOM	ATTIC LIVING ROOM	EXTERIOR	BED ROOM 1	BED ROOM 3	CELLAR					
			DINING ROOM	BED ROOM 2	BED ROOM 4	KITCHEN					
					BED ROOM 5						
					BED ROOM 6						
HOUSE OF PASTA	LIVING ROOM	EXTERIOR	BED ROOM 2	BED ROOM 1	KITCHEN						
		ROOFFED CORRIDOR			BED ROOM 3						
		ATTIC LIVING ROOM			BED ROOM 4						
					BED ROOM 5						
					CELLAR						
MERLIM HOUSE	LIVING ROOM	ATTIC LIVING ROOM	EXTERIOR	KITCHEN	CORRIDOR	BED ROOM 1	CELLAR A	BED ROOM 2			
							CELLAR B	BED ROOM 3			
MORET HOUSE	LIVING ROOM	EXTERIOR	CORRIDOR	PORCH	CELLAR A	KITCHEN	BED ROOM 1	BED ROOM 3	BED ROOM 4	CELLAR B	
			DINING ROOM			ATTIC LIVING ROOM	BED ROOM 2				
ROSSATO HOUSE - EULALIA ALTA	ATTIC LIVING ROOM	KITCHEN	LIVING ROOM	BED ROOM 1	CELLAR						
			EXTERIOR	BED ROOM 2							
				BED ROOM 3							
				BED ROOM 4							
				BED ROOM 5							
SIMADON HOUSE	CELLAR	ATTIC LIVING ROOM	EXTERIOR	BED ROOM 2	KITCHEN						
			LIVING ROOM	BED ROOM 3	BED ROOM 1						
				ATTIC							
SOMENSI HOUSE - IN THE VALLEY	LIVING ROOM	ATTIC LIVING ROOM	EXTERIOR	KITCHEN	BED ROOM 3	CELLAR					
				BED ROOM 1	BED ROOM 4						
				BED ROOM 2	BED ROOM 5						
					BED ROOM 6						
SOMENSI LARENTIS HOUSE	LIVING ROOM	EXTERIOR	BED ROOM 3	KITCHEN							
	ATTIC CORRIDOR	ROOFFED CORRIDOR	BED ROOM 4	CELLAR							
		CORRIDOR	BED ROOM 5	BED ROOM 1							
			BED ROOM 6	BED ROOM 2							
			BED ROOM 7								
			BED ROOM 8								
			BED ROOM 9								
TONIOLLO HOUSE	LIVING ROOM	ATTIC LIVING ROOM 1	EXTERIOR	ATTIC LIVING ROOM 2	DINING ROOM	BED ROOM 1	BALCONY	BED ROOM 7	PORCH	KITCHEN	CELLAR
								BED ROOM 8			STORAGE 1
											STORAGE 2
ZACHET HOUSE	LIVING ROOM	EXTERIOR	KITCHEN	BED ROOM 1	WASH. PREP.						
		DINING ROOM		BED ROOM 2							
				BED ROOM 3							
				BED ROOM 4							

vice parts of the houses. In most cases when ringiness is found the living room does not belong to the ring and it is at least one step far from it, making the whole structure deeper regarding the exterior space, reinforcing the role of the living room for the family. Now porches and roofed corridors become transitional spaces between the exterior and the interior of the houses. The tree-like shape is the prevailing structure within the sample and the living room is always some steps apart from the exterior space, enclosing the private area of the house, which is organized through the living room, the most important and integrated space in the configuration. The deepest spaces from the exterior are always the bed rooms, protecting the private life of the family.

In this case, the genotypes produced are explained in table 4.

The ringy structure found in all houses in the first case is substitute in most houses for a tree-like structure when the houses are spatially organized for the daily life of the families. Excluding the second genotype, which somehow reproduces the common genotype found in the first case, it is possible to observe that in more than 84% of the houses the configuration is used to reinforce the relations within the members of the family and the interaction with strangers is kept spatially related to rooms of the service part of the house and not with the living room like in the first case.

Table 3. Order of Integration of the Rooms of the Houses with the Exterior Space Connected to the Living Room

	ORDER OF INTEGRATION										
HOUSE	1	2	3	4	5	6	7	8	9	10	11
ARSEGO HOUSE	ATTIC LIVING ROOM	KITCHEN	LIVING ROOM	BED ROOM 1	EXTERIOR						
			PORCH	BED ROOM 2	CELLAR						
				BED ROOM 3							
				BED ROOM 4							
				BED ROOM 5							
				BED ROOM 6							
COMIOTO HOUSE	LIVING ROOM	DINING ROOM	ATTIC LIVING ROOM	KITCHEN	EXTERIOR	BED ROOM 1	BED ROOM 6	CELLAR A	PORCH		
						BED ROOM 2	BED ROOM 7	CELLAR B			
						BED ROOM 3	BED ROOM 8				
						BED ROOM 4	BED ROOM 9				
						BED ROOM 5					
DESTRO HOUSE	DINING ROOM	KITCHEN	LIVING ROOM	EXTERIOR	ATTIC LIVING ROOM	LARDER	CELLAR	BLACKSMITH/CELLAR	CARPENTRY	BED ROOM 4	BLACKSMITH STORAGE
		PORCH					BED ROOM 1			BED ROOM 5	
							BED ROOM 2			ATTIC	
							BED ROOM 3				
GABARDO HOUSE	LIVING ROOM	ATTIC LIVING ROOM	DINING ROOM	EXTERIOR	KITCHEN	CELLAR					
	BED ROOM 1			BED ROOM 3							
	BED ROOM 2			BED ROOM 4							
				BED ROOM 5							
				BED ROOM 6							
HOUSE OF PASTA	LIVING ROOM	ROOFFED CORRIDOR	ATTIC LIVING ROOM	BED ROOM 4	BED ROOM 1	EXTERIOR	KITCHEN	BED ROOM 3	BED ROOM 5	CELLAR	
								BED ROOM 4			
MERLIM HOUSE	LIVING ROOM	KITCHEN	EXTERIOR	BED ROOM 1	BED ROOM 2						
		ATTIC LIVING ROOM	ATTIC CORRIDOR		BED ROOM 3						
					CELLAR A						
					CELLAR B						
MORET HOUSE	DINING ROOM	LIVING ROOM	PORCH	KITCHEN	EXTERIOR	ATTIC LIVING ROOM	BED ROOM 1	CELLAR A	BED ROOM 4	CELLAR B	
			CORRIDOR		BED ROOM 3		BED ROOM 2				
ROSSATO HOUSE - EULALIA ALTA	ATTIC LIVING ROOM	KITCHEN	EXTERIOR	LIVING ROOM	CELLAR						
			BED ROOM 1								
			BED ROOM 2								
			BED ROOM 3								
			BED ROOM 4								
			BED ROOM 5								
SIMADON HOUSE	CELLAR	ATTIC LIVING ROOM	LIVING ROOM	EXTERIOR	KITCHEN	BED ROOM 1					
					BED ROOM 2						
					BED ROOM 3						
					ATTIC						
SOMENSI HOUSE - IN THE VALLEY	LIVING ROOM	ATTIC LIVING ROOM	KITCHEN	BED ROOM 1	BED ROOM 3	EXTERIOR	CELLAR				
				BED ROOM 2	BED ROOM 5						
					BED ROOM 6						
SOMENSI LARENTIS HOUSE	LIVING ROOM	ATTIC CORRIDOR	CORRIDOR	BED ROOM 3	ROOFFED CORRIDOR	EXTERIOR	BED ROOM 1	CELLAR			
				BED ROOM 4		KITCHEN	BED ROOM 2				
				BED ROOM 5							
				BED ROOM 6							
				BED ROOM 7							
				BED ROOM 8							
				BED ROOM 9							
TONIOLLO HOUSE	LIVING ROOM	ATTIC LIVING ROOM 1	DINING ROOM	ATTIC LIVING ROOM 2	PORCH	KITCHEN	BED ROOM 7	SMALLER GRANARO	EXTERIOR	BED ROOM 3	BED ROOM 1
					BED ROOM 1	BALCONY	BED ROOM 8			BED ROOM 4	
										BED ROOM 5	
										BED ROOM 6	
										SMALLER GRANARO	
ZACHET HOUSE	LIVING ROOM	DINING ROOM	KITCHEN	EXTERIOR	BED ROOM 1	WASHING/PREP.					
					BED ROOM 2						
					BED ROOM 3						
					BED ROOM 4						

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Houses of two realms

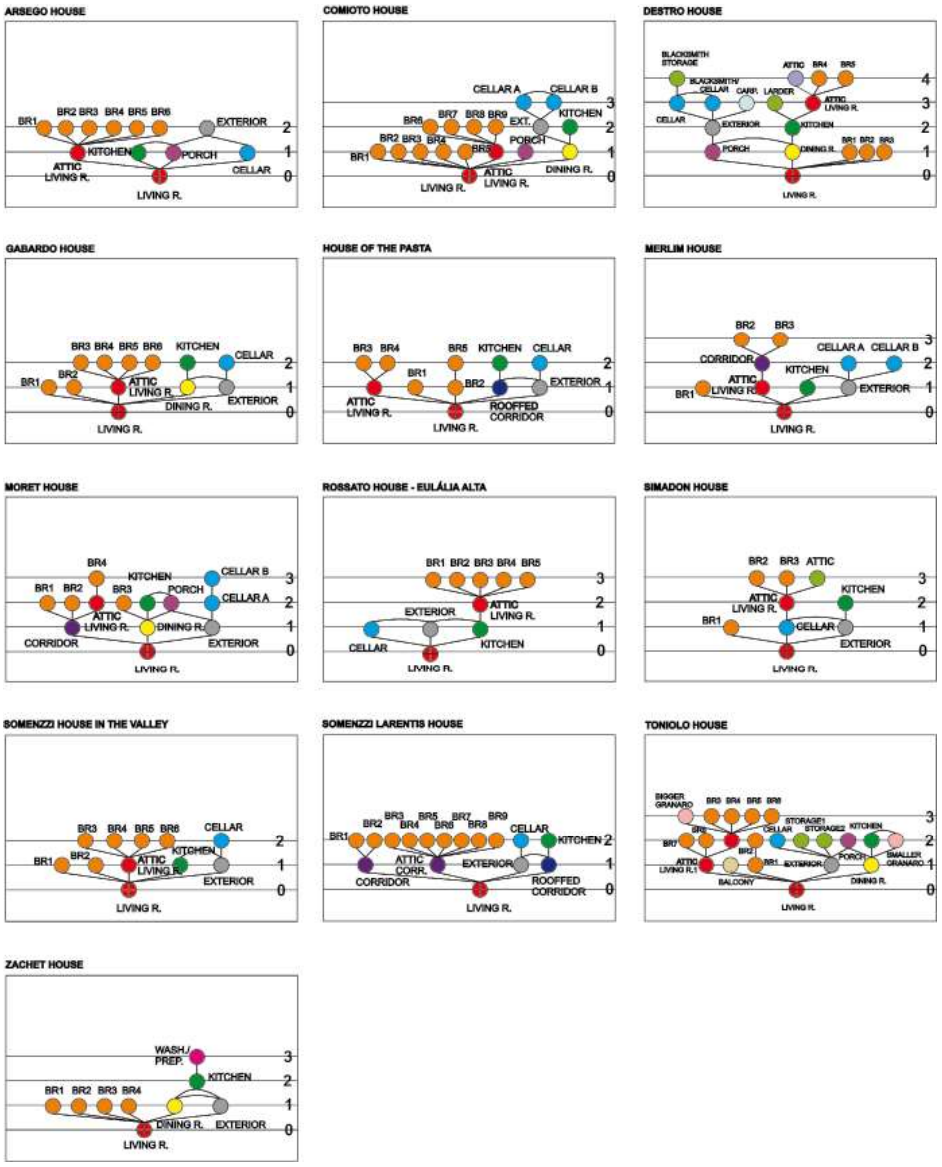
The spatial flexibility, which allows that the same house can fulfil different purposes, is obtained by using a simple but very effective spatial strategy. By opening or closing the connection between the exterior and the living room - the space responsible for the reception of strangers and the internal organization of the house - it is possible to control the access and movement of strangers on liminal occasions.

The differences can be evaluated through the morphological arrangements made in order to cope with rites of passage in the life of the family and with the long periods of time when the relational life is particularly limited within the family members.

When the door connecting the exterior space to the living room is closed, the configuration is organized in a tree-like structure, with the living room as the central space between the private and service parts of the house but, at the same time, keeping the private area some steps far from the exterior. The entrance to the house from the exterior is made by intervening spaces like porches, roofed corridors or some service rooms like the dining room, adding depth from the entrance, protecting the whole socio-spatial organization. This structure also reflects a strong social control over the family members that is imprinted in the way the space is organized to support a patriarchal society.

In the other case, when the door connecting the living room to/from the exterior is open, the structure becomes looser, with some rings of movement and control.

Figure 3. Graphs of the houses, with the door connecting the exterior space to the living room open

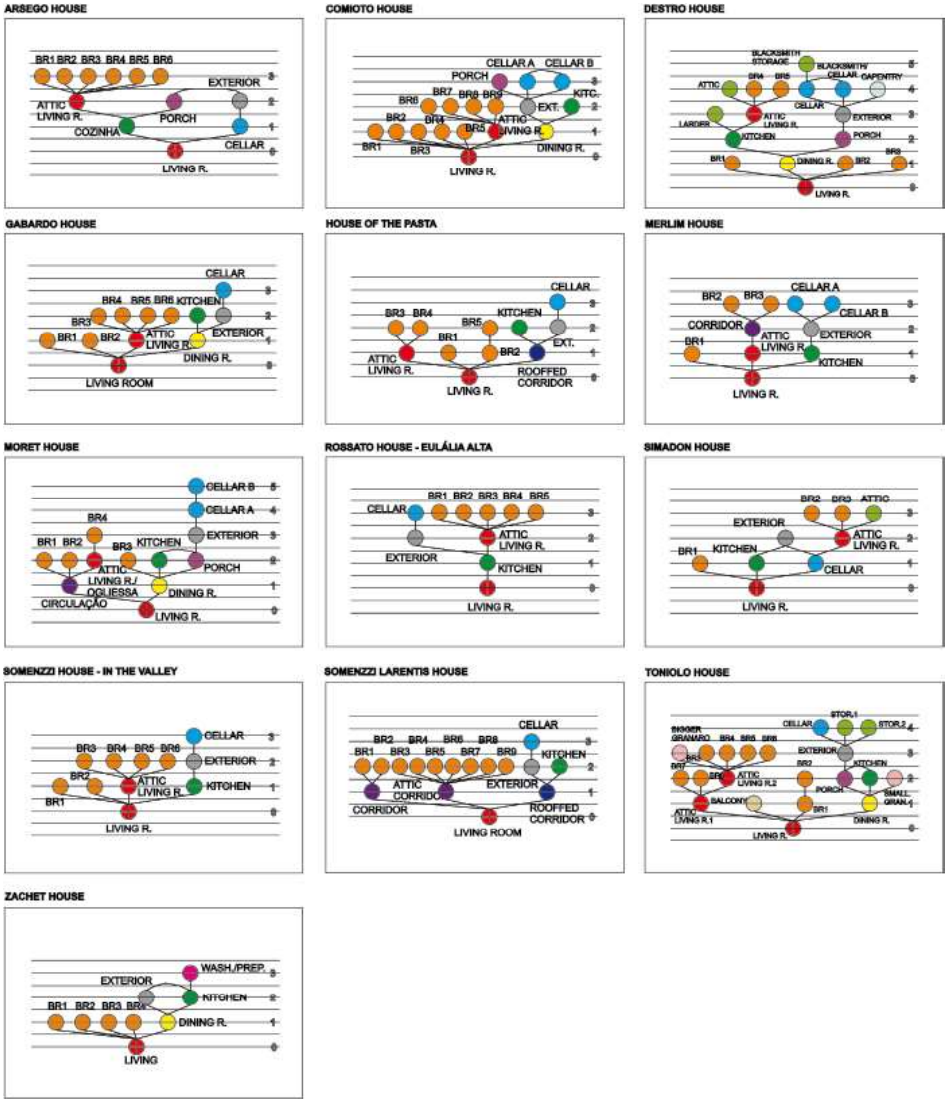


The house of the first Italian immigrants in Brazil concentrates the entire life of the family. Visitors and strangers are received on special occasions to share rites of passage when they are allowed to enter the house in a controlled way.

The spatial solution described in this paper was a very common strategy within the first Italian immigrants in Rio Grande do Sul State in Brazil, which means that similar spatial strategies were shared among a community structured around common language, beliefs and cultural backgrounds. The construction of the houses was made following individual decisions, rooted in a cultural environment and producing similar structures. This implies that individual decisions were biased by the way the immigrants were able to build a spatial system that could inform about the social structure and meaning within the community.

It is important to remark that the patriarchal family structure that prevails in this area is the key to understand the layout of the houses in the way they work for almost the entire daily life of the family. Rites of passage are breaks in this ordinary routine, a moment when the entire family – and the house – is open to the interface with strangers. This openness temporarily loosens the strict rules that govern the house and the members of the fam-

Figure 4. Graphs of the houses, with the door connecting the exterior space to the living room closed



ily, but they are re-established as soon as the liminality is over: two rules in two different spatial arrangements in the same building producing a house of two realms, one that is open to strangers and, the other one, that reinforces de rules of the master of the house.

References

Barbieri, G. (1962) *La casa Rurale nel Trentino* (Leo S. Olschki Editore, Firenze).
Hanson, J. (2003) *Decoding Homes and Houses* (Cambridge University Press, Cambridge).
Hillier, B. and Hanson, J. (1984) *The Social Logic of Space* (Cambridge University Press, Cambridge).
Migliorini, E. and Cucagna, A. (1969) *La Casa Rurale nella Montagna Bellunese* (Leo S. Olschki Editore, Firenze).
Shoul, M. (1993), 'The Spatial Arrangements of Ordinary English Houses', *Environment and Behaviour* Vol. 25 No. 1, January 1993, p. 22-69 (Sage Journals).
Turner, V. (1969), 'Liminality and Communitas'. In *The ritual Process: structure and anti-structure* (Aldine Publishing, Chicago) p.358-374.

Morphological change within residential areas: a Turkish case

Tolga Ünlü
Mersin Universitesi Mimarlik Fakultesi Ciftlikkoy Kampusu, 33343, Yenisehir, Mersin, Turkey
Keywords: morphological change, building types, redevelopment cycles, Turkish cities

Abstract

Turkish cities experienced basically five morphological periods after the nineteenth century. In the first two of these, cities sustained their spatial composition and the content of their built environments, giving rise to coherent character formation. In the following three periods, many cities underwent rapid development beginning during the early decades after the Second World War. As a result of morphological processes during the second half of the twentieth century, in many cities the historical urban fabric was replaced by a new urban tissue that led to the formation of a new spatial composition and content of the built environment.

The rapid population increase and rapid growth of cities gave rise to redevelopment within residential areas. Multi-family apartment blocks replaced single-family houses. This change was affected by the enactment of new planning legislation and emerging new forms of planning practice. At the end of the twentieth century, new residential building was particularly manifested in new housing estates, especially groups of high-rise apartment blocks.

This study examines morphological processes within the residential areas of Turkish cities that were developed in the course of the twentieth century, focusing on the city of Mersin. In relation to plot and building patterns, the influence of local actors and exogenous factors are scrutinized. This provides the basis for a discussion of urban fabric formation in Turkish cities.

Introduction

Particular buildings are special entities in the urban landscape that contribute formation of a character. As Whitehand (1994) depicts, the English cities experienced a physical growth of residential areas that are added to each other in a historical process. From core to periphery, it is possible firstly to observe Victorian terraced houses, which are followed by inter-war semi-detached house, modern terraced houses in an Anglo-Scandinavian style in the post-war period, and pseudo-vernacular style in the 1980s.

However, it should not be expected all buildings to retain their original forms in the built environment during all periods. Cities will grow towards surrounding areas through adding new residential areas to the built-up areas, and occupying the surrounding agricultural lands. As cities grow outward in an additive process, the built-up areas face with formative processes of townscape –accumulation, adaptation, transformation and replacement (Conzen, 1966, p.57-59). The accumulation of forms usually results with replacement of old building types with the new ones. The making of urban tissue is the outcome of dialectical interplay between purposeful planning practices, everyday spontaneous practices, and resilience of the inherited built environment itself and the building culture of which it is a product (Gauthier, 2005).

The cultural and historical character of any settlement commonly reflects not only the work and aspirations of the society at present but also that of its precursors in the area. These attributes of cultural landscape represent and important and unique aspect of our environment. As form after form is added to the earth's surface by a socio-geographical group within its area of occupation or habitat, the whole landscape becomes as 'objectivation of spirit' of society in its own cultural context and historical context of its area. (Conzen, 1966, p.59).

Conzen focused on the plot at a micro-scale and observed the burgage cycle through the relationship between plots and block plans of buildings (Whitehand, 2001, p.105). Conzen (1960, 1969) had shown how the complexity of the forces at work was manifested in street patterns, and plot and building patterns. In areas of long sequence of sustained human effort and the changing style of civilization, accumulation produces distinct historical stratification in the urban landscape. (Conzen, 1966, p.58). And the relationships between the kinds of physical form at different scales are articulated (Kropf, 2014).

While Conzen's work provided a foundation for development of historico-geographical perspective on urban form, at the same time –in post-war period- Muratori was developing the basic principles of typological studies. Both traditions took the individual plot as the basis for establishment of methodological framework. With their influence, the change in the urban landscape win the Western world was investigated in many different cultural context. In the last decade, there is a growing interest on the study of urban form of Chinese cities. In ISUF conferences, this growing interest is taking attraction. The last two conference records reveal that study on Turkish cities began to take place in the cross-cultural perspectives. However, there is still a lack about explaining the structure of the Turkish city and the morphological processes it experienced.

This study examines morphological processes within the residential areas of Turkish cities that were developed in the course of the twentieth century, focusing on the city of Mersin. In relation to plot and building patterns, the influence of local actors and exogenous factors are scrutinized. This provides the basis for a discussion of urban fabric formation in Turkish cities. However, this study should be taken into consideration as an inception to a further overwhelming discussion.

Structure of Turkish cities

Although this study attempted to put forward some generalizations about the structure of Turkish cities and the changes in urban form, its findings is depending upon the study of urban form of the city of Mersin. The study revealed that Turkish cities experienced basically five morphological periods after nineteenth century. Nineteenth century is taken into consideration as temporal limit and inception of growth for Turkish cities, because the modernization efforts of the Ottoman Empire gave rise to replacement of

old urban tissue with some *new* ones. The second morphological period is the early Republican period, which was initiated with proclamation of Turkish Republic in 1923 and lasted until the end of 2nd World War. In this era, young republic wanted to express the attitudes and understanding of new nation in the urban landscape through inauguration of new cultural and governmental institutions in the inner fringe belt.

Morphological change was limited within the historical cores of the cities during the Ottoman modernization and early Republican periods, due to the limited population growth. However, especially in the historical cities like Istanbul traditional urban tissues was replaced by so-called modern ones, with the effect of modernization discourse. During these two periods, the inner fringe belt began to be consolidated within the built-up area. The Ottoman modernization period experienced introduction of railway stations and new government houses, while many new governmental, institutional and cultural institutions began to take place in the inner fringe belt during the early Republican period. Furthermore, the latter also witnessed emergence of first suburban development, which was attached to the historic core and inner fringe belt as a second plan division.

First suburbanization trends were not depending solely on the improvements in transportation. The first suburban environments were located at a walking distance to the central core of cities. However, like seen in London for instance, newly emerging bourgeoisie class began to isolate itself in the urban landscape through forming its own urban landscape, in which the basic building type was single-family detached house.

The post-war period witnessed a rapid population increase in Turkish cities, with an effect of migration from agricultural lands to cities. Consequently, new type of urban environments, which were informal housing quarters, began to girdle the old cores of cities and to become parts of either inner or middle fringe belts. On the other hand, inner change in the second plan divisions emerged during the post-war period. Resultant form is the replacement of single-family houses with the multi-family apartment type.

During the two periods after 1980, a second wave of rapid development gave rise to urban sprawl, which introduced a new housing type at the outskirts of cities. These are housing estates, consisting of more than one apartment block in one plot, probably in one building block. In other words, the plot and block are the same in this type of housing formations. New housing environments have their own facilities within their plot, including playgrounds, commercial and social uses.

In this study, the morphological processes and development cycles are examined in Çamlıbel residential quarter, which is the second plan division, added to historical core of the city of Mersin. Therefore, it is a result of first suburbanization trend in the city and emerged in the second morphological period.

Morphological processes in Çamlıbel residential area

According to the Ottoman archives, the settlement layout of the neighbourhood was produced through a land readjustment process in the first decade of twentieth century. The site was then an agricultural land, attached to the west section of the inner fringe belt[1]. Although it was a suburban area, it is not separated from the built-up area; rather it was designed as an extension along the main spine of the core city, of which the name was Kışla Street[2].

As a result of the readjustment process, the street and block pattern of the neighbourhood was formed. Many single-family detached houses were erected along the extension of Kışla Street in the neighbourhood. These were two-storey houses of the prominent merchants of Mersin, placed in large gardens (Figure 1). In other words, the initial physiognomy of Çamlıbel neighbourhood was depending on production of two-storey single-family detached houses on large plots. Despite the fact that plot dimensions can vary from block to block, the plot series along Kışla Street reveals the similar morphological characteristics.

[1]For a detailed analysis of inner fringe-belt formation and modification processes in the city of Mersin, please look at Ünlü (2013).

[2]Kışla, literally means "military barracks".

Figure 1. Single-family house in Çamlıbel residential area in the first decade of twentieth century

Although the district was formed during the early Republican period as a distinct environment, with the introduction of single-family houses as a new building type, the rapid development of the city in the second half of twentieth century led to pressures on plots to be developed in a greater density. This development resulted in building replacement processes, either in the parent plots or the derivative plots. The new building type is the multi-family apartment blocks in the former plots (Figure 2). The number of apartment blocks was dependent on whether the plot was faced with a division process. If it did not, then the apartment replaced the single-family house in the parent plot. However, the common case was to have derivative plots after a division process in the parent plot and to construct apartment blocks both in place of the former houses and the new and unoccupied derivative plots.

The result of the building replacement and plot division processes, the change in the urban landscape became visible and observable. The new conditions, emerged in the third morphological period, points out the introduction of a new housing type, which resulted in increase in building height, and the number of families living in one plot. Else, the plot dimensions changed, where the former large plots were divided into smaller derivatives. Together, the building and plot processes resulted in the increase in building coverage and density, and emergence of more than one apartment block in the parent plot.

As a third development, which emerged after 1980s, a new type of apartment block emerged in the district. This new type is different form the previous apartment type, depending on its relation to parent plot. In the former case, the parent plot was divided into two derivatives and one apartment block was erected in each derivative plot. Then, the result is the replacement of one single-family house with two apartment blocks within the boundaries of parent plot. In the new conditions, the parent block is not divided and it is retained in its original form until the last a few decades (Figure 3). There might be a single-family house on the plot, or it may remain in urban fallow condition. In either case, an apartment block was raised within the boundaries of parent plot.

Although new type of apartment is higher than the previous one, it has a smaller, but larger than the single-family house, building coverage in the plot. Consequently, it brought about a larger garden area, which is mostly used as a car parking area. In the

Figure 2. Multi-family apartment blocks replaced single-family houses of the previous period

former case, since the apartments are placed with a large coverage in the plots, there was no place for car parking, and the inhabitants used streets for the same purpose. In other words the results on the ground changed in terms of building height and coverage, and number of buildings, but the density of the building did not change since the single apartment again used the total floor area of the possible former two apartments. Then, it is better to point out that, the new apartment type emerged as a reaction to the problems of reaching to public services, like car parking area, and to serve those problems personally by the users of apartment.

Discussion and conclusion

This study has departed from the aim of identifying the morphological periods Turkish cities experience during the twentieth century and to distinguish the dominant building types in these periods. It is basically based on a research on the city of Mersin, which is a relatively young city, founded in the nineteenth century. However, it faced with a rapid change especially in the last century and provides an all-encompassing base for investigating the morphological processes in Turkish cities.

It has been revealed that single-family detached house, placed within a large garden, was the dominant building type in the first half of twentieth century in Turkish cities. On the one hand, it was produced spontaneously by the property owners in the surrounding area of historical core and the inner fringe belt, while on the other hand, it was an intentionally chosen building type for planners and architects who prepared urban plans of the period.

Replacement of single-family house with the multi-family apartment block in the post-war period came into being through individual actions. Although the replacement process was confined to the plot, it brought about a neighbourhood effect for the surrounding plots in the first instance, and for the other areas of the district. On this account, inception of replacement processes changed the overall character of the area after penetration of the same attitude to other plots. The resultant form experienced a dramatic shift in the morphological characteristics.

Therefore, the replacement process was mostly spontaneous and incremental. How-

Figure 3. New apartment type in the third development period

ever, it is obvious that it was affected and directed by the new legislative regulations of the period. Especially, Condominium Law, enacted in 1965, gave rise to emergence of multi-family apartment blocks on each plot, due to the development pressures coming from the inhabitants.

Apart from the replacement processes, demands to change the building use, especially on the ground floors, to add new storeys, e.g. roof floors, to divide or amalgamate the flats within the apartment blocks have been evident in the individual actions of the plot owners. However, it is significant that the exogenous factors are less significant than the local agencies. Almost all of architectural projects are produced by local architects. Therefore, it is possible to assert that the evolution of urban form is embedded within its local context.

The findings of the study reveal some basic characteristics for transformation of Turkish cities. However, in order to get more generalizable results, the study needs to embrace different cities in varying regions of the country. Furthermore, there is a need for more micro-morphological analysis in order to get more detailed and accurate explanations.

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References

Conzen, M. R. G. (1960) *Alnwick: Northumberland: a study in town-plan analysis* Institute of British Geographers Publication 27 (George Philip, London).
Conzen, M. R. G. (1966) 'Historical townscapes in Britain: A problem in applied geography', *Northern Geographical Essays*, in honour of G. H. J. Daysh, University of Newcastle upon Tyne.
Conzen, M. R. G. (1969) *Alnwick, Northumberland: a study in town-plan analysis*, Institute of British Geographers Publication 27, 2nd edn (Institute of British Geographers, London).
Gauthier, P. (1995) 'Conceptualizing the social construction of urban and architectural forms thorugh the typological process' *Urban Morphology*, 9(2), 83-93.
Kropf, K. (2014) 'Ambiguity in the definition of built form', *Urban Morphology* 18, 41-57.
Whitehand, J.W.R. (1994) Development cycles and urban landscapes, *Geography*, vol. 79 (1), no. 342.
Whitehand, J. W. R. (2001) 'British urban morphology: the Conzenian tradition', *Urban Morphology*, 5(2), 103-109.

A New Urban Topography of Residential Artificial Grounds in Seoul

Hee-Seok Kim, Hyo-Jin Kim, Seongwoo Nam
Department of Environmental Planning, Seoul National University, South Korea
Graduate Programme in Urban Design, Seoul National University, South Korea
Department of Environmental Planning, Seoul National University, South Korea
Keywords: artificial ground, apartment complex, typology, urbanity, South Korea

Abstract

Koreans' preference for living in high rise apartment buildings has changed the sky-line of South Korean cities since the 1970s. Today the resultant morphological change in terms of building mass spreads downward to the more profound aspect of Korean urban form – the urban topography. In the 1990s, installing concrete platforms covering the whole ground of apartment complex and vertically separating pedestrians and cars was proposed as a solution to insufficient space for parking and leisure use. The idea, urbanism of artificial ground, was originally conceived from various modernist ideal city concepts and was realized by the public in the West. Later in South Korea, apartment complexes with artificial grounds have gradually spread by the private sector to solve the needs for more space by superposing city over city. As a result of the introduction of artificial ground, apartment complexes have become green and quiet oases in the mid-dle of busy city by burying urban nuisances underground. Despite the practical origin, Korean residential artificial grounds as a pseudo-rural village, constitute a Korea's own ideal city model today. The success of the residential artificial grounds in the country in contrast to the failure in the West, however, can be read as flight of the middle class from the traditional city and a reaction to malady in the urbanity of Korean cities.

Introduction

The rapid progress of construction technology after Industrial Revolution and development of modernist architecture theories profoundly changed the urban form of modern cities. The most striking feature in contemporary cityscape are the skyscrapers which happens to be one of the prominent symbol of modernity. However, the less highlighted part of cities – the ground also experienced a fundamental transformation as an extension of the verticalization of modern cities. While the ground had originally provided horizontal space for building footprints and roads, today's ground has become a bi-functional space by providing useable space both on surface and underneath in modern cities. This change mainly came from the search for more living space that can house more people and large scale urban infrastructures, most notably transportation networks. Modernist urban thinkers in the mid twentieth century, however, were not satisfied with simply adding individual built-up spaces underneath the existing ground. They proposed adding another layer of manmade ground, namely artificial ground (hereafter AG), over the natural ground for an efficient and integrated use of underground. One of the best known realizations influenced by these utopian dreams is La Défense in Paris, a business district entirely built over a series of AGs.

However, the ongoing westward expansion of La Défense – Seine Arche is no longer employing AG today and in line with the pre-modern urban tissue in terms of morphology. As evidenced in Seine Arche, the urbanism of AG is now largely a past in Europe. Yet in South Korea, private apartment complexes which have been popular among the middle class since the 1970s, started to adopt AG from the early 2000s. During the next decade, residential AG continued to develop and practically became a norm by 2010. Nowadays the continued spread of apartment complexes with AG through urban renewal is slowly transforming the shape and character of Korean cities. The questions arising from the divergent realities from the two different contexts are:

- How do residential AGs physically manifest in Korean cities?
- What factors made the residential AG successful in South Korea relatively late?
- What are the implications of its success in urban space and urban life?

This study perceives the residential AG as a type of the urbanism of AG which is a city model evolved from modernist city ideals. The theoretical development of the urbanism of AG in the West and South Korea is examined to understand its emergence and nature. Its application in practice in citywide perspective is investigated in Seoul where urban renewal through construction of apartment complexes takes place actively. The detailed realization and the urbanistic implications of the residential AG are formulated through the observation of a case in Seoul.

Methodology

The study approaches apartment complexes with AG in macro and micro perspectives. At macro level, the study investigates apartment complexes in Seoul, completed during 2000-2011 with surface area more than 2 ha to examine the prevalence and evolution of artificial grounds in apartment complexes. As the number of such apartment complexes is more than 300 and scattered all over Seoul, they were observed with the help of satellite images and street view services. Satellite images were used to observe the horizontal configuration of apartment complexes. Street view services were employed to get detailed visual information of the apartment complexes and to observe both the original and newly created topography. As detailed plans of apartment complexes are not available due to privacy reasons, the management offices were surveyed by phone to grasp the underground structure of apartment complexes. The survey result was analysed with the help of architectural records such as floor area ratio, green area ratio and parking capacity. At micro level, a neighbourhood for case study was chosen to observe an apartment complex with AG and the old urban tissue surrounding it. Researchers travelled to the site and took extensive field notes to identify the organizational logic of the urban tissue.

Urbanism of artificial ground as a city model

Eugène Hénard challenged the old notion of ground that "the bottom of the road must be on a level with the ground in its original condition" (Hénard, 1910). He conceived a multi-layered underground infrastructures and wanted to install them on natural ground and cover them with artificial ground for easy access and maintenance. Water, communication and electricity networks were to be installed directly below artificial ground and railways were constructed to be over natural ground. While Hénard's future city kept the traditional urban form on ground largely intact, Le Corbusier and his CIAM movement proposed a radically different cityscape through elimination of streets resulting to superblocks. Deeming streets disruptive to motor traffic due to many crossings they generate, the urbanist dreamed of a city consisting of superblocks bordered by artery roads whose large platforms are devoted for greenery and pedestrians (Le Corbusier, 1922). Fumihiko Maki (1964) established a typology of urban form according to the relationship between basic elements consisting of it. The group form is a sum of elements in human scale, organically formed over time. The compositional form is a collective form in which the relationship between elements are 'preconceived and predetermined'. The modernist superblock is an example of compositional form. The newest form is the megastructure, 'a large frame in which all the functions of a city or part of a city are housed'. In a megastructure, elements are not simply related but integrated as a part of the whole and the structure is independent from topographical limits, as can be seen in Kenzo Tange's megastructure over Tokyo Bay (1960).

Today's urbanism of AG as a practice is not a product of single city concept but a product of negotiation between the ideals and the socioeconomic and technical realities. Although many other influences such as Buchanan Report (1960) are cited as the contributors to the rise of the urbanism of AG (Lefebvre, 2003; McLure, 1995:24-25), the root concepts which inform other ideas and define this urbanism are the three city models of the twentieth century – underground urbanism, modernist city of the CIAM and megastructure. Considering its theoretical origins and application in practice, the urbanism of artificial ground can be defined as an urban development in the form of multi-layered single structure whose platforms horizontally connecting buildings but vertically separating infrastructures and traffics underneath and pedestrians and greenery above. The artificial ground is the ultimate solution to remove conflicts between pedestrians and cars. Both movements don't need to stop for the other due to the 'fluidity' obtained from their vertical separation by the AG (Lefebvre, 2003:215). Placing all the infrastructures, especially roads and parking significantly increase available space on ground which tend to be used as parks, ponds or simply an empty space. The urbanism of AG also increases urbanizeable areas by building over already existing infrastructures. However, these advantages centred on efficiency accompany significant prices. Acquiring more space through superposition and building over an already built space require complicated engineering techniques and the costs for construction and maintenance can become prohibitive (Lefebvre, 2003:185). The expanded horizontalness of upper platform after elimination of cars can become useless or even detrimental to the built environment when it merely remains as a space left over after planning (SLOAP) (Hebbert, 2008). The most prevalent problem of this urbanism is that the fluidity is only valid within artificial ground and cut off from the exterior (Mangin and Panerai, 2002:173). The 'verticalness' of the urbanism of AG cannot help bringing in vertical accesses and facades along its border. Its facades at the edge facing outside streets often form an anonymous movement space where social interaction and exchange can't happen (Carmona et al., 2010:89). Limited number of vertical accesses separates AG from the environs locally and fragments urban tissue globally. Although brought into vogue in the post war period, the urbanism of AG was condemned by critiques in the West (Warnier and Bayle, 1995:11) and rarely applied thereafter.

Residential artificial grounds in Seoul

Emergence of the artificial ground

It was Swoo-Geun Kim who introduced the idea of AG in South Korea in his book, *The image of the future city* (1962). Influenced by Le Corbusier and megastructure theory, he

thought that spatial efficiency and freedom from topographic constraint of the urbanism of AG could cure the urban ill of rapidly growing Seoul in the 1960s (as cited in Choi and Kim, 2015). His Yeouido Master Plan (1969) for the future CBD of Seoul envisaged pedestrian decks linking high-rise buildings in its centre but, deemed too ideal, was not materialized (Jung, 1996). His idea was realized in Sewoon Arcade (1967), a megastructure of mixed use, which also had pedestrian decks. Nevertheless, the separation of pedestrians and cars were only partially implemented and the project has generally been considered as a failure like many of its Western counterparts. Three decades later, practical needs for AG made the idea resurface in smaller scales, notably for apartment complexes.

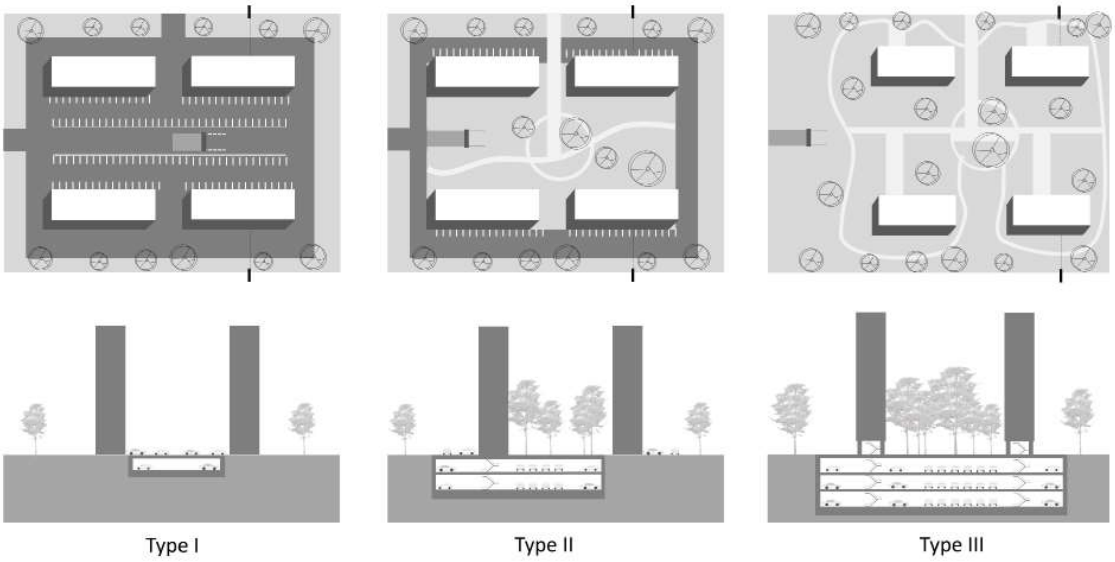
Between 1995 and 2010 in South Korea, gross national income per capita increased by 1.8 times (Bank of Korea, 2015) and residential floor area per person increased from 17.3m^2 to 25.0m^2 by 1.4 times (Statistics Korea, 2015). The need for more living space due to the increased income hasn't been limited for the floor area. There have also been the increasing demand of space for parking and green spaces and these needs manifested as the change of planning regulations and marketing strategy of apartment contractors. Use of the underground of apartment complex for parking began in the mid-1980s when domestic car ownership was increasing by five times for every decade from 1970 to 1990. The period saw the appearance of new apartment complexes equipped with underground parking lots for the first time. Planning regulations followed suit by making 30% of all parking to be built underground compulsory for new apartment complexes in large cities with apartment units exceeding 85m^2 through the Regulations on Housing Construction of 1991. The ratio kept increasing up to 60% in 1999 but the clause on compulsory underground parking was removed in 2010 when making enough underground parking for apartment complexes became customary for any new development. The same regulation also made it mandatory for apartment complexes to dedicate 30% of the surface area for greenery in 1991.

While the increase of floor area per capita resulted to decreased density of apartment complexes (See Tab 1), spatially conflicting desires of expanding parking and park made the former go underneath the latter through the adoption of AG. Building an AG over natural ground without digging to accommodate parking was envisaged in the early 1990s and realized in some public housing estates from the mid-1990s. The first realization of private apartment complexes with fully pedestrianized AG in Seoul came in 2001. The gradual emergence of the urbanism of AG from the 1990s culminated to an established dominance of fully pedestrianized apartment complexes by 2010.

Typology of residential artificial grounds

Recent apartment developments over 2 ha in Seoul completed during 2000-2011 were investigated to observe their evolution and to draw a typology from the process. 316 apartment complexes for investigation include those built by both the private and the public contractors but social rental estates were excluded. 2000, the previous year of the completion of the first fully pedestrianized apartment complexes (See Type III below) was chosen as the starting point of investigation. The typology is based on the configuration of open space and underground structure of apartment complexes and happens to correspond to their evolution over time. Type I is a car oriented apartment complex where the asphalt (road and parking) covers most of the complex and amenities exist dispersed in the periphery. Underground parking lots are multiple and disconnected from apartment buildings and each other. In Type II, the relation between asphalt and green is reversed in which pedestrian space such as parks and squares occupies the centre and parking lots are scattered in the periphery. Underground parking lots starts being integrated to apartment buildings and to each other. Type III fully adopts the urbanism of AG and places a single large underground parking lot beneath AG linked with all the apartment buildings (See Fig 1). Some of Type III complexes have parking entrances in the middle of compound, thus allow cars on ground, while others have them at the edge of complex, thus realize a completely car free environment on ground. A gradual transition between types and the consequent 'pedestrianization' and greening of apartment complexes through the use of AG have occurred over time. It is expected for the existing Type I complexes to be gradually converted to either Type II or III through redevelopment or remodelling pro-

Figure 1. Morphological evolution of apartment complexes in Seoul during 2000-2011 (Author: Hyo-Jin Kim and Hee-Seok Kim)



cess. The resulting morphological changes from the typological transition is significant and demonstrate the advantages of the urbanism of AG in terms of life quality. The evolution from Type I to III results to decreased building coverage ratio, increased green area ratio and parking space and decreased density (See Tab 1). It means that residents of Type III can enjoy more open space, parks and parking space in a less crowded environment, which was made possible by the increased space obtained from multi-layered grounds.

Creation of new topography and urbanity

Fractured neighbourhoods

A neighbourhood in Seoul where Type III developments are located adjacent to low rise residential area, was chosen as the site for case study for easy observation of interaction and contrast between the old and new urban tissues. The neighbourhood is located in the centre of Geumho-dong1, a dense residential area strategically located between two CBDs of Seoul. Geumho-dong[1] sits on a hilly basin girdled by mountains ranging from 90 to 170m in altitude. Formerly a residential area with sub-standard housing, now over the half of Geumho-dong has been converted into large apartment complexes and more of them are being built. Seoul Metropolitan Government has overseen urban renewal of the area using the Joint Redevelopment Scheme, a housing redevelopment system wholly financed by the private sector to transform run-down areas into high rise apartment complexes. However, the city has lacked an integrated approach on the area as a whole, thus each apartment complex fulfils separate function with little connection beyond its border. The area also suffers from severe physical disconnection caused by uncoordinated urban renewal projects each aiming to build apartment complexes over hills (Kang and Pae, 2012). The site in question is centred on an apartment complex completed in 2012 and other new apartment complexes, being surrounded by naturally formed urban tissue. It is located on a hill embraced by artery roads in north, east and south. The site had been entirely composed of small residential and commercial buildings not exceeding five storeys until 2000s but the northern half was recently redeveloped into three apartment complexes simultaneously. As a result, the original hilly terrain was reorganized into a series of unrelated platforms having sharp vertical edges. The neighbourhood is distinctive in showing a contrast between apartment complexes

[1]*Dong* is the lowest level of administrative division in South Korea.

Table 1. Typology of apartment complexes in number in Seoul during 2000-2011

Type	Number of complexes	Dominant period	Morphological features			Density (households per ha)
			Building coverage ratio	Green area ratio	Parking per resident	
I	88	2000-2002	0.21	0.26	1.19	239
II	127	2003-2004 2007-2009	0.20	0.33	1.28	219
III	101	2005-2006 2010-2011	0.19	0.36	1.41	203

with AG - a manmade feature of landscape and a group form (Maki, 1964) adapted to land relief. The focus will be on Geumho Raemian[2] Highriver (hereafter Highriver) as a typical case of Type III development.

Frame and elements

Highriver forms a single large structure composed of AG as the frame and buildings attached to it. As the altitude gap between the highest and lowest adjacent lands of AC1 reaches as high as 45m, there exist two major platforms constituting the AG: one at 45m and the other at 54m in altitude. Thus, 9 meter gap exists between the platforms and a total of 35m gap exists between in and outside of Highriver. The access road to parking forms a loop entering the lower platform on ground and goes through beneath the upper platform which houses two floors of parking, filling the 9 meter interior gap. Parking lots and a large part of the community centre form two underground floors of the lower platform. The four storey of parking space is equal to the half of floor area used for apartment units. Most of the edge of the two platforms differ in altitude with the surroundings and only two entrances of the lower platform has the same altitude with outside terrain because height variation within a platform is limited to less than 50cm. The most pronounced gap, a manmade cliff of 25m high, was created at the eastern limit facing the artery road. The façade as long as 200m forms a fortress wall in the middle of dense city.

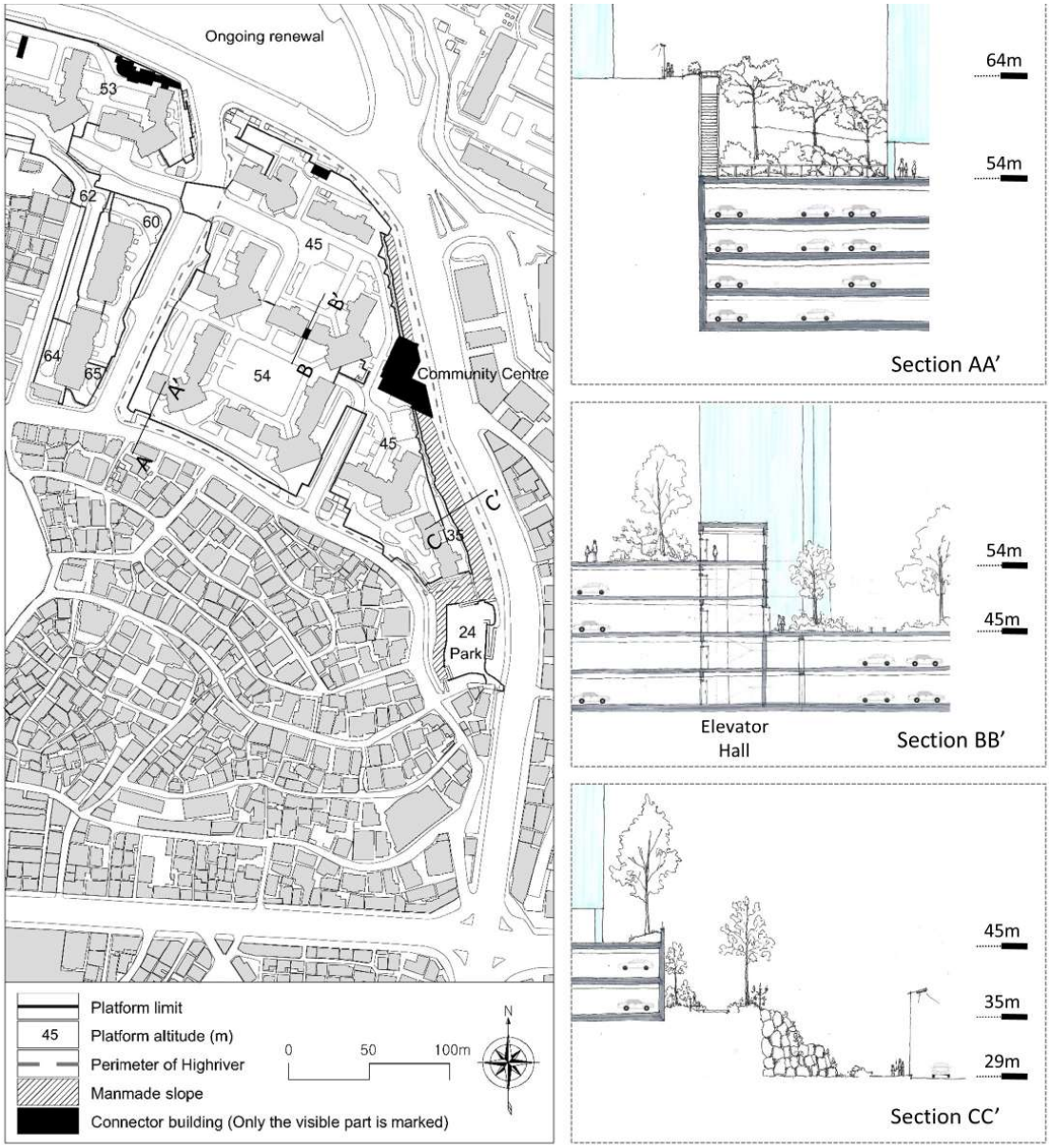
Major buildings of Highriver are ten apartment towers as high as 20 storeys, a community centre and a shopping centre. They can be categorized as inner and connector buildings according to their relationship with AG. Being inside the AG, inner buildings can be accessed only through the AG. All the apartment buildings of AC1 are inner buildings. Connector buildings straddle two different grounds to smooth transition from one ground level to another (De Mont-Marin and Ernek, 2014:35). The connector function is undertaken by the community centre and the shopping centre. These buildings alleviate brutal split between the natural and artificial grounds in terms of aesthetics and functions. They are also vertical corridors equipped with elevators and stairways connecting different ground levels. The community centre, straddling the eastern cliff, is frequented by people taking elevator between the AG and the artery road. However, this vital corridor and the entire community centre is only open for the residents of Highriver who pay for the maintenance of the community centre.

Retreat of urbanity

The distinct atmosphere of Highriver can be summed up to otherworldliness. Unlike the hard walking conditions outside due to rugged terrain, walking is a breeze in the complex where the natural constraint is overcome by AG and machines (Kang and Park, 2009). The inside of the complex is completely flat thanks to platforms and the severe vertical gaps within and with outside are solved by elevators or cars. The verdure and the tranquillity of the complex is another contrast to the traditional neighbourhood in the south where buildings are tightly packed together leaving room only for narrow streets.

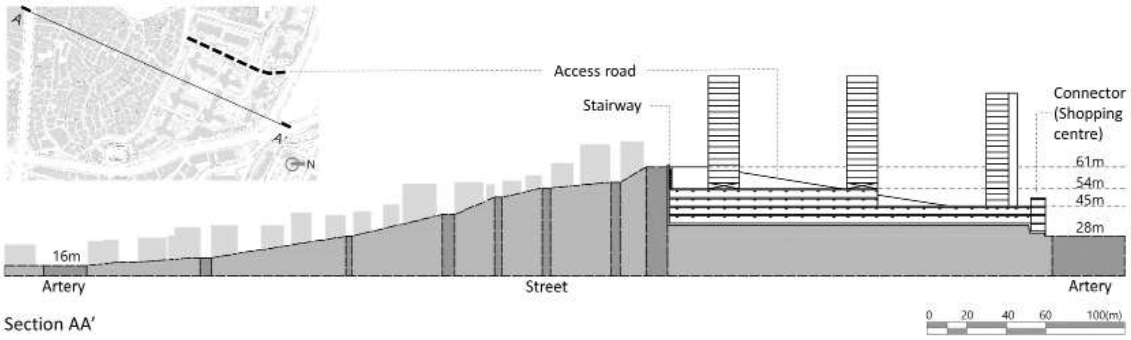
[2]Raemian is the apartment brand name of a major Korean contractor.

Figure 2. Platforms and borders of the neighbourhood (Author: Hyo-Jin Kim & Hee-Seok Kim)



The residence is a park where every available space is devoted for greenery, children's play or rest as a part of the housing marketing strategy (Samsung C&T, 2015). By defining every space on AG for noble use, Korean apartment complexes with AG took departure from the similar residential developments with AG of the previous generation in the West where bare concrete occupies a significant portion of the ground. However, the elimination of streets and conventional city life is the same result found in both. While traditional streets are defined by buildings, the 'paths' crisscrossing platforms link different elements irrespective of their border, especially through piloti voids of apartment buildings (See Fig 4). The pedestrian paths stretch to underground when movements of people and cars can't be completely separated in reality despite the intended separation. Some utility and emergency vehicles should be on ground to fulfil their functions and pedestrians choose shortcuts underground to go to destinations in and outside of the apartment complex, especially when the weather is hostile (Cheong, 2010:70). Various possible choices of path on and underground, coupled with limited passing pedestrians

Figure 3. Cross section of Highriver and the southern residential area (Author: Hyo-Jin Kim)



from outside, result to exceptionally low density of pedestrians. Quietness and reduced opportunity of encounters are the product of this artificial low density.

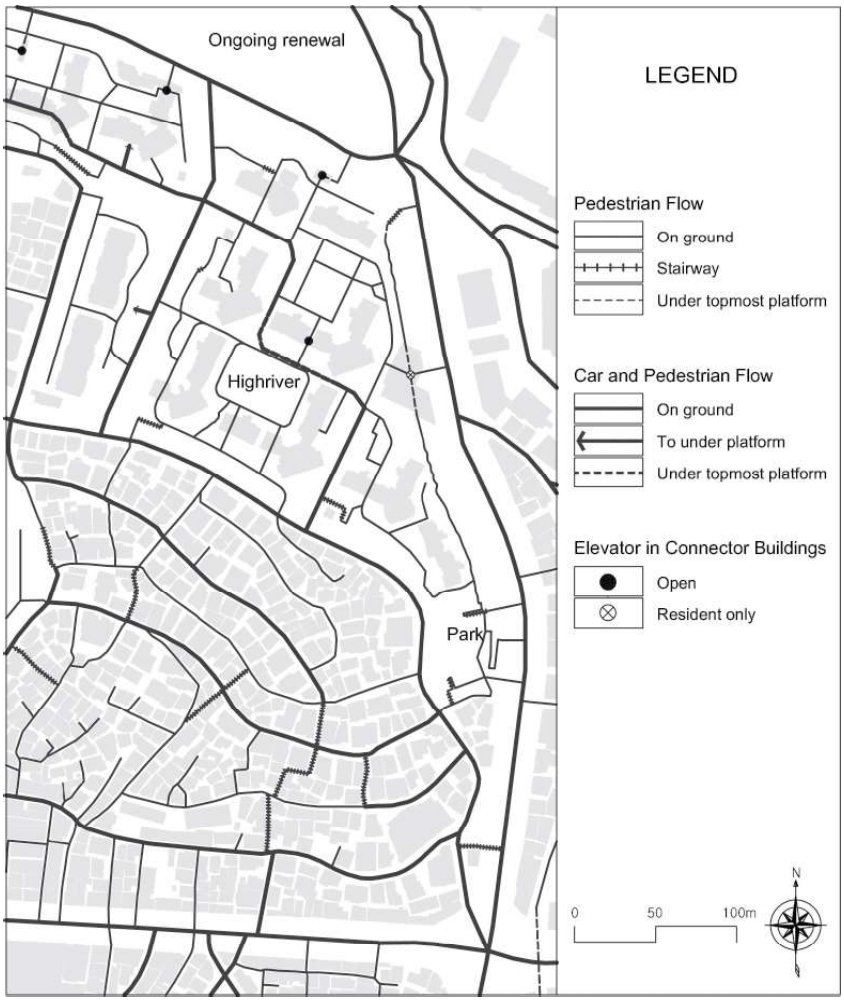
Considering a park is not a residential space in reality, 'towers in countryside' is more befitting for Highriver than 'towers in a park', the Le Corbusian ideal for cities. The apartment complex possesses many environmental qualities of a rural village. Their basic configuration is same in that buildings are surrounded by the green and connected not by streets but by paths. Lacking interaction with buildings, paths only carry people without generating social encounters as much as streets do (Holston, 1989:107-109). Both spaces tend to be secluded and wary of outsiders. Highriver is one of gated apartment complexes commonly found in South Korea where local public goods such as park are self-sustained and exclusive (Kim, 2015). Although not systematically enforced, a sign in the complex demands for outsiders not to enter their park. The vertical ruptures all around the complex is a physical barrier replacing the remoteness of rural villages. However, Highriver is not really a rural village, either. Although both spatial settings are propitious for communal life, the community of an apartment complex largely ends at having homogenous members in social background vetted by housing price, in contrast to closely knit rural communities strongly attached to the space itself. It is a pseudo-rural village where the wilderness and the pre-modern social fabric are clinically removed. The middle class seek a pastoral but artificially tamed environment in apartment complexes with AG without the worry of privacy invasion or unwalkable steep hills that may inflict a rural village. It is a romanticized living space that can be bought with money (Alvarez-Rivadulla, 2007).

Conclusions

While the urbanism of AG in Europe and Korea in the 1960-70s were based on ideal city models, the current apartment complexes with AG in Korea are the result of an incremental adaptation to the needs of housing consumers and the government guidance in order to obtain the most space in a limited area. Being practical rather than ideological, the residential AG of South Korea is successful in satisfying the fundamental goals of the urbanism of AG: separation of traffics and acquisition of more open space, at the same time being financially feasible through privatization of developments. Today Korean residential urbanism of AG is an ongoing phenomenon multiplying its success by converting old flat urban tissues into a three-dimensional space. The utmost expansion of the noble space and the burial of urban nuisances by AG guarantee an agreeable life but results to loss of urbanity where seclusion triumphs over exchanges.

How do we interpret the success of the modernist principles in Korean cities and their continued evolution when Jane Jacobs passed death sentence over Robert Mose's modernist urban renewal of New York several decades ago (Hall, 1988:230)? Should we see the phenomenon as a more feasible implementation of the modernist ideals in a specific context or a symptom of malady in urbanity? The first approach was dealt with in depth in the study but the second approach remains largely unanswered. Although

Figure 4. Pedestrian and car flows of the neighbourhood (Author: Hee-Seok Kim)



the flight of the urban elites to enclaves or suburbs is a global phenomenon, an overwhelming preference for pseudo-rural life in the inner city can be a wake-up call for the failure of residential planning in creating desirable urbanity. Today a significant imbalance exists between stagnating conventional residential neighbourhoods under public management and rapidly evolving apartment complexes by private resources in Korean cities. This imbalance places the neighbourhoods with rich urbanity such as the southern neighbouring area of Highriver in the bottom of the pecking order for housing selection. Improvement of the liveability of these neighbourhoods through investments and proper planning will prove that urbanity is at least as desirable as pseudo-rurality and entice the middle class from seeking peaceful seclusion to enjoying surprise filled urbanity.

Acknowledgement

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References

Alvarez-Rivadulla, M. J. (2007) 'Golden ghettos: gated communities and class residential segregation in Montevideo, Uruguay', *Environment and Planning* A 39, 47-63.

Bank of Korea (2015) *Economic Statistics System* (http://ecos.bok.or.kr/) accessed 2 June 2015.

Carmona, M., Tiesdell, S., Heath, T. and Oc, T. (2010) *Public spaces, urban spaces – the dimensions of urban design* (Architectural Press, Oxford).

Cheong, L. (2012) 'Study on the pedestrian usage of the underground spaces in apartment complexes', unpublished MA thesis, Seoul National University, South Korea.

Choi, L. and Kim, H.-S. (2015) 'The artificial land manifested in Kim Swoo Geun's Urban Architecture in late 1960s –focusing on Sewoonsangga and Yeouido Master Plan', *Journal of the Architectural Institute of Korea* 31:1, 95-104. [In Korean]

De Mont-Marin, G. and Ernek, B. (2014) 'From railroads to residents: Paris Rive Gauche Project – [re]developing the city on the city' in *Affordable housing through urban regeneration: proceedings of International Conference on Affordable Housing through Urban Regeneration* (ed.) Korea Land and Housing Corporation, Seoul, 24-38.

Hall, P. (1988) *Cities of tomorrow* (Basil Blackwell, Oxford)

Hénard, E. (1910) 'The cities of the future' in *Transactions of the Town Planning Conference London* (ed.) The Royal Institute of British Architects, 1911, London, 345-367.

Hebbert, M. (2008) 'Re-enclosure of the urban picturesque: green-space transformations in postmodern urbanism', *The Town Planning Review* 79:1, 31-59.

Holston, J. (1989) *The modernist city: an anthropological critique of Brasília* (The University of Chicago Press, Chicago)

Jung, I.-H. (1996) 'A study on the urban development of Yoido', *Journal of the Architectural Institute of Korea* 12:2, 123-134. [In Korean]

Kang, H.-M. and Park, S.-H. (2009) 'Characteristics of walking environment in apartment complexes on hilly sites: focusing on the mobility of residents on wheels', *Journal of the Architectural Institute of Korea* 25:6, 187-196. [In Korean]

Kang, Y.-J. and Pae, J.-H. (2012) 'Network panning on the open spaces in Geumho-dong, Seoul', *Journal of the Korean Institute of Landscape Architecture* 40:5, 51-62. [In Korean]

Kim, H.-S. (2015) 'Gated communities in South Korea and the dilemma of the state' in Bagaeen, S. and Uduku, O. (ed.) *Beyond gated communities* (Routledge, London) forthcoming in June 2015.

Le Corbusier (1922) 'Ville contemporaine de trois millions d'habitants', unpublished urban project.

Lefebvre, V. (2003) *Paris-ville moderne: Maine-Montparnasse et La Défense, 1950-1975* (Editions Norma, Paris).

Maki, F. (1964) *Investigations in collective form* (School of Architecture, Washington University, St Louis).

Mangin, D. and Panerai, P. (2002) *Projet urbain* (Editions Parenthèses, Marseille).

McLure, B. (1995) 'Le Rapport Buchanan trente ans après' in Ateliers d'été (ed.) *L'Urbanisme de dalles – continuités et ruptures : Actes du colloque des ateliers d'été de Cergy* (Presse de l'Ecole nationale des ponts et chaussées, Saint-Quentin).

Samsung C&T (2015) *Raemian Geumho Highriver* (http://raemian.co.kr/sales/sub/highriver/?menuSeq=114) accessed 2 June 2015. [In Korean]

Statistics Korea (2015) *National Statistics Portal* (http://kostat.go.kr/) accessed 2 June 2015.

Warnier, B. and Bayle, C. (1995) 'Introduction : L'urbanisme de dalle, entre ruptures et continuités' in Ateliers d'été (ed.)

Vertical Tissue: architectonical interpretation of the skyscraper

Pina Ciotoli
Draco PhD School, "Sapienza" University of Rome, 53A, via Gramsci, 00197, Rome, Italy
Keywords: skyscraper, typology, passages, vertical tissue, analogy

Abstract

The aim of this paper is to analyze the skyscraper as an architectural organism, and to interpret the vertical city like a "vertical tissue". Previously, the skyscraper, studied as an architectural type, was defined as a block developed in height (Pevsner, 1976) isolated from the urban context and opposed to the historic city (Maffioletti, 1990). This research is based on the concept of "organism" (Strappa, 1995), and it examines the skyscraper as a building type in which it is possible to identify a solidarity between the vertical structuring axis and residential units (example noticed in the first buildings of Chicago) (Condit, 1979). The skyscraper is therefore not considered as a model of the so-called "utopia of gigantism" (Samonà) that characterized the modern city in recent years, but as a system that can create a new vision of the city; so the skyscraper is treated like a basic element to compare an alternative model for the modern city. To study the vertical city like vertical tissue it is first necessary to define the skyscraper as architectural organism, therefore to interpret the aggregation of skyscrapers such as an urban organism, underling the "urban" features in which the vertical element is the matrix design for a new city-system. Thanks to this methodology we can study the city not as a set of architectural singularity but as vertical system, in which we can recognize both an architectural and urban organism.

The aim of this ongoing research is to propose a new typological interpretation of the skyscraper, proving that the type par excellence of the modern city, has been defined through the same logical principles of the city and through the study of urban fabric.

The individual examples of architecture are based on a larger scale in which, through the recognition of 'fixed and original characters' (Strappa, 1995) and through the definition of different levels of authenticity, it is possible to identify a link between the architectural structure of the skyscrapers and the 'processual dynamics' that characterize the Nineteenth Century city.

Chicago looks like the ideal case study to define some 'basic conditions' for the 'birth' of the new building type. Since it is a city of foundation (1830), all the urban reasons that could have determined and typified the skyscraper, are very clear, and yet completely unexpressed.

The close relationship between the skyscraper and the urban structure of Chicago, therefore between type and building fabric, establishes the key role of the 'environmental unit', that is able to summarize in itself the harmony of 'urban landscape, architectural strength, and continuity and plastic firmness of architectural forms' (Muratori, 1963).

Furthermore, the civil environment as the society, can express itself (themselves) in a certain historical and cultural context. For this reason the background is able to 'be qualified and to be determined within the architectonical structure' (Muratori, 1963), that are identified through a systematic reading of the city based on the notions of organism and of type.

Also, it should be emphasized that each architectural entity identifies a specific experience, repeated many times, for the purpose of responding to the typical needs of the society.

The type, especially in its original form, is tightly tied with the psychological and cultural climate where it has been originated. Therefore, it becomes the synthesis of all common characters that could be given or adapted in different environments.

In a such as vivid portrait of Nineteenth century Chicago, the skyscraper identifies a

Figure 1. Chicago 1898

morphogenetic region of the type, showing how the architectural experience is a specific answer to the needs imposed by the historical townscapes.

In fact, the commercial inclination of the city and the 'not-aggregative' logic of urban fabric, have strongly influenced the typology of the skyscraper, which shows common features, especially in the ground level, with the formative process of covered market squares, the systems of galleries and the 'passages'.

These ones can be considered as modern models compared to the different historical variations that have been succeeded to the commercial building (market) typology.

As indicated by Walter Benjamin, the Parisian 'passages' embody the 'place of modernity', responding to the urban necessity to allow the construction of commercial buildings isolated from the vehicular roads.

In this way the new structures are 'protected from weather and from traffic', like in the case study of Chicago. In order to trace the typological and functional similarities between the skyscrapers and the 'passages', it is essential to investigate the urban role of the latter, by defining their formative process.

First, it is appropriate to point out that these architectural elements 'are linked to the housing unit on which they are built. For this reason, the cadastral unit should be considered together with the road system, as the founding element of urban space' (Lemoine, 1990).

The 'passages' play an active role compared to the city, considered as an organism, since their architectural structures are related to new construction or to the existing ones, around a particular axis; according to the pedestrian flows generated inside, the 'passages' become a real meeting place for citizens, acting as a vital element for the city.

These features make them even more similar to the analogous American type, since the ground floors of the skyscrapers, are used as aggregative spaces, serving the general public.

The architectural role of the covered square is particularly clear in the architectural layout of the Rookery Building[1], typified by a squared hollow volume with a inner glass covered court, made of iron and light steel framing[2].

Inside the court, characterized by the vaulted roof and by two monumental staircases, takes place the overturning of the paths, like in the architectonical formation of Italian Palazzo; in this way the shops are accessible from this specialized inner space.

Similarities between these two architectural entities, are even more pronounced in case studies like the Garrick Theater Building[3], the Auditorium[4] and the most recent case of CNA Center[5], in which the structures are characterized by external arcades.

In brief, if the Parisian case is determined by a narrow and elongated space, better defined as an organism with serial aggregation of compartments around an open enclosure, the American one could be defined as a polar organism with organic aggregation of compartments (stores and shops windows) around a covered space, whether the latter structure is a square or an arcade.

In the typological process, the covered space continues to have public function in the lower floor (like a market square), while in the subsequent plans, it specialized its structure in the central structural core of the skyscraper, that coincides with the role of the serving space.

Using the analogy as a tool, it is possible to determine morphological and functional affinities between types that, even though belonging to different geographic areas, present common method to manage a relationship with the urban fabric.

To clarify the influence of the urban structure in the definition of the skyscraper as an architectural type, it is necessary to emphasize the 'organic' action carried out by the paths and by the axes of the urban structure. Both are able to determine the most visible

[1]Rookery Building was built between 1885-1886 by Burnham & Root.

[2]For a detailed description of the Rookery Building is recommended: Condit C.W. (1952) The Rise of the Skyscraper, (University of Chicago Press, Chicago).

[3]Garrick Theater Building (its former name was Schiller Theater Building) was built between 1891-1892 by Adler and Sullivan. It has been destroyed in 1961.

[4]Auditorium Building was built between 1887-1889 by Adler & Sullivan.

[5]CNA Center has been built between 1970-1973 by Graham, Anderson, Probst & White.

Figure 2. Rookery Building, inner courtyard

aspect of the urban fabric, trying to impose any spatial and aggregative features, (readable in the urban fabric), which become 'formative' traits for the type.

Therefore, the paths and the axes symbolize the 'ideal bridge', as much conceptual as tangibly real, which links the notion of 'fabric' to the concept of 'type'.

Furthermore, it is necessary to explain the distinction between the meaning of 'path' and 'axis', due to the 'different intentionality that has generated them' (Strappa, 1995), and to the different purpose of the architectural space.

Against this background, the path is definable as product of a 'spontaneous use of anthropic space', clearly visible in the 'building fabrics related to basic buildings' (Strappa, 1995), while the axis is due to the conscious design intent, and it is bound to tissues characterized by 'expressive intentionality' (Strappa, 1995). Within the typological process, the paths have prevailing attitude on defining the fruitive system of specialized building types (organism with serial aggregation), while the axes impact on specialized tissues, (as in the case study), with a greater level of readability.

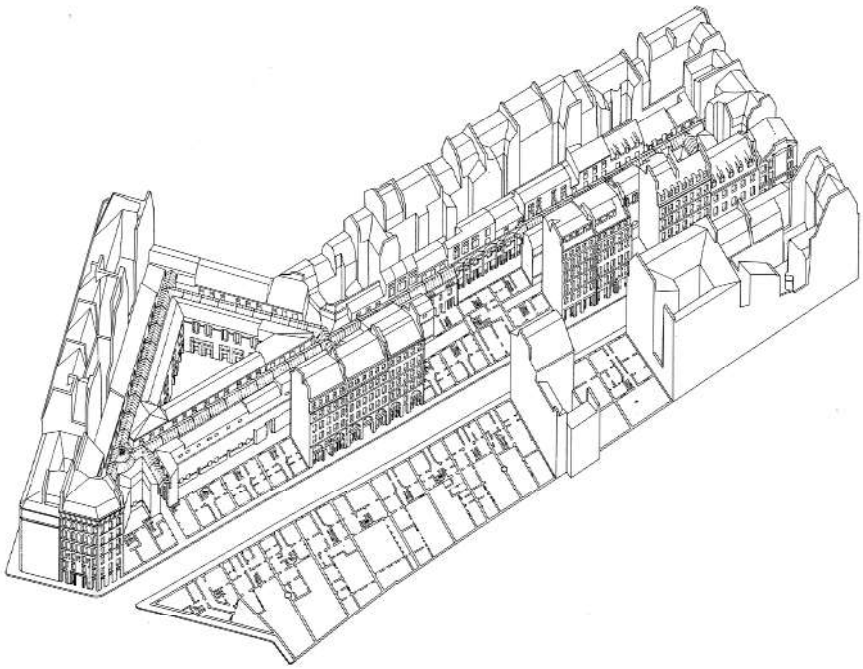
In addition to the distinction between the role of paths and axes in the formation of tissues, it is possible to find another grade of interpretation, focused on the different emphasis of the axis, (splitting or centralized function), respect to the architectural space.

In fact, as Giuseppe Strappa says, 'the axis (pointing out a real fruition or a virtual one) establishes an order inside the urban organism, defining a set of relationships identifiable as centralization of structural connections, and as a symbolic expression of all its elements' (Strappa, 1995).

The centralized axis refers to 'the space and to its legibility, and in particular to the reaching of a node or pole starting from another node or pole' (Strappa, 1995).

For this reason, it is more appropriate to distinguish the notion of 'centralized axis' from the 'splitting line'; the term 'line' is not related to the idea of movement as well as to the readability of the urban structure. Usually the splitting lines, while connecting the internal features of organic systems, close off architectural spaces through the identification of unique spaces, although complementary and necessary for the entire organism.

Figure 3. Passage du Caire, Paris



In this morphological process, the streets of Chicago behave like splitting lines, facilitating serial aggregation of compartments around the fringe of the block. However the 'quadrillage' logic, extended throughout the territory, determines a specialization only in the Loop area, where all Chicago's first skyscrapers were located, until the first thirty years of the Nineteenth century.

This differentiation in the urban fabric, is due to the preponderant presence of vehicular roads and of railways networks. The need of spaces dedicated to pedestrians, as it has been said for the Parisian 'passages', determines the urban need to overturn the dynamics of the paths, as autonomous systems, inside the block.

If it is represented as a splitting line, the highways of Chicago carry out a clear separation between the external structure and the commercial space located in the block.

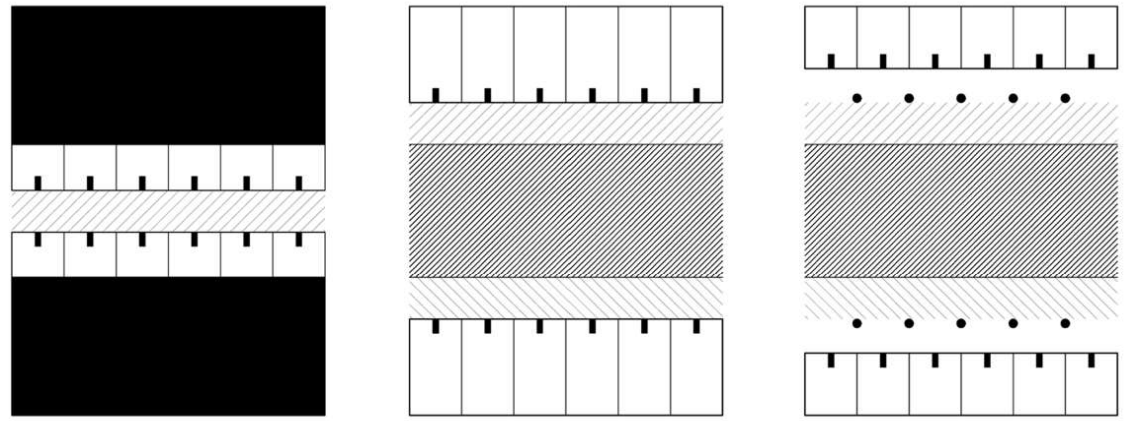
The element of connection between the outer layer and the inner place is represented by the arcade and, in cases in which this item is not present, by the overturning of the routes inside the building, with the creation of the stores, (so the serial units can aggregate around the fringe of the block).

The pedestrian path thus obtained, architecturally distinguishes between the inside and the outside on the ground floor, while in the other floors becomes specialized, turning serving distributive space for the whole architectural system.

All this is clearly revealed in the architectural section of the skyscraper, where the organic, mutual relationship between serving and served space is evident; inside the building there is a hierarchical organization of the architectural space, by reproducing in a smaller scale, those external urban dynamics, that have anyhow determined some of the original and unique characters of this type.

The new typological interpretation, proposed in this paper, is therefore based on the morphological approach, and it tries to investigate the topic by identifying a system as much complex as easy to be summarized into few elements, (pathways, spaces, places, hierarchies, aggregations), in order to define the skyscraper as an example of contemporary organism.

Figure 4. Comparison between Parisian passages and Chicago skyscrapers.
From left to the right: (first) Formative process of passage into the Parisian block; (second) General building fabric in Chicago; (third) Building fabric in Chicago: formation of the arcades.



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References

Benjamin W. (2003), *Paris capitale du XIX siecle*, (Allia, Paris).
Bonshek J. (1988), "The skyscraper: a catalyst of change in the Chicago construction industries, 1882-1892" in *Construction History,* vol. 4, pp. 53-74.
Cantarelli R. (2012), *L'architettura dell'edificio mercato: bazar, shopping center e circuito globale*, (Il Poligrafo, Padova).
Cataldi G. (ed) (2013), *Saverio Muratori architetto: (Modena 1910-Roma 1973) a cento anni dalla nascita*, (proceedings, AION, Firenze).
Condit C.W. (1979), L*a scuola di Chicago: nascita e sviluppo del grattacielo,* Brunetti F., Porciatti A.M. (eds), (Libreria editrice fiorentina, Firenze).
Condit C.W. (1952) *The Rise of the Skyscraper*, (University of Chicago Press, Chicago).
Domosh M. (1989), "A method for interpreting landscape: a case study of the New York World Building", in *Area*, vol. 21, pp. 347-355.
Geist J.F. (1982), *Le passage: un type architecturale du XIX siecle*, (Mardaga, Liège).
Lemoine B. (1989), *Les passages couverts en France*, (Delegation a l'action artistique de la ville de Paris, Parigi).
Muratori S. (1963), *Architettura e civiltà in crisi*, (Roma: Centro studi di storia urbanistica, Roma).
Pevsner N. (1976), *A History of building types*, (Princeton University Press, Princeton).
Rowe C. (1980), "Chicago frame" in *The mathematics of the ideal villa and other essay,* (MIT, Cambridge).
Strappa G. (1995), *Unità dell'organismo architettonico*, (Dedalo, Bari).

Chair_Jeremy Whitehand
School of Architecture and Planning The University of Auckland, New Zealand
University of Birmingham, United Kingdom
Co-Chair_Valentino Danilo Matteis
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197,
Rome, Italy

Urban Knots
New Trends in Urban Design
Public Spaces
Modern and Contemporary Urban Fabric
Typological Process

Urban Growth

An Evolutionary Model for Urban Development

Mohammed Makki

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Abstract

In the context of the rapid growth of urbanized population as well as the effects of climate change and diminishing natural resources, the methodology by which cities are designed in the next 30 years is crucial to the success or failure of sustaining the growing numbers in the population. In this perspective, population based evolutionary algorithms, driven by biological evolutionary principles, excel over conventional problem solving strategies through their ability to optimize for multiple conflicting objectives, therefore generating multiple optimal solutions rather than a single optimized solution, allowing for a diverse solution set to a problem that has no clear single solution. To test this, a computational multi-parameter approach driven by an evolutionary model of development is implemented on an urban patch in the city of Barcelona.

Introduction

In the opening statement of Stephen Marshall's, '*Cities, Design and Evolution*', he states that "Among all species – it is perhaps only humans who create habitats that are not fit to live in" (Marshall, 2009, p.1). Marshall argues that the 'unplanned' cities of the past have proven to be more habitable, economical and sustainable; creating a correlation between how complex cities function and how functional order is achieved through evolution in nature. In this perspective, the conventional method of urban planning implemented in the 20th century, in which the city was designed not unlike a machine, adhering to an idealistic notion of planning a generic city that is applicable regardless of region, climate or topography, commonly resulted in dire impacts on both global and local scales. This has triggered a reassessment and revision of traditional urban design methods in order to establish a more sustainable modus operandi for urban development.

In recent years, this has propagated an in-depth analysis of understanding a city within a biological context, an approach introduced as early as the late 19th century by Patrick Geddes (Batty and Marshall, 2009). Thus, developing a city as an organism, through a biological evolutionary model, attempts to establish a substantial and applicable methodology for cities that develop through adaptation rather than optimization, reflecting traits – already acquired by natural systems – of energy efficiency, environmental response, regeneration and climatic (and cultural) adaptation. Marshall clarifies that "the 'argument from evolution' suggests that adaptive incremental change can lead to great transformations and a diversity of forms in the long term" (Marshall, 2009, p.14).

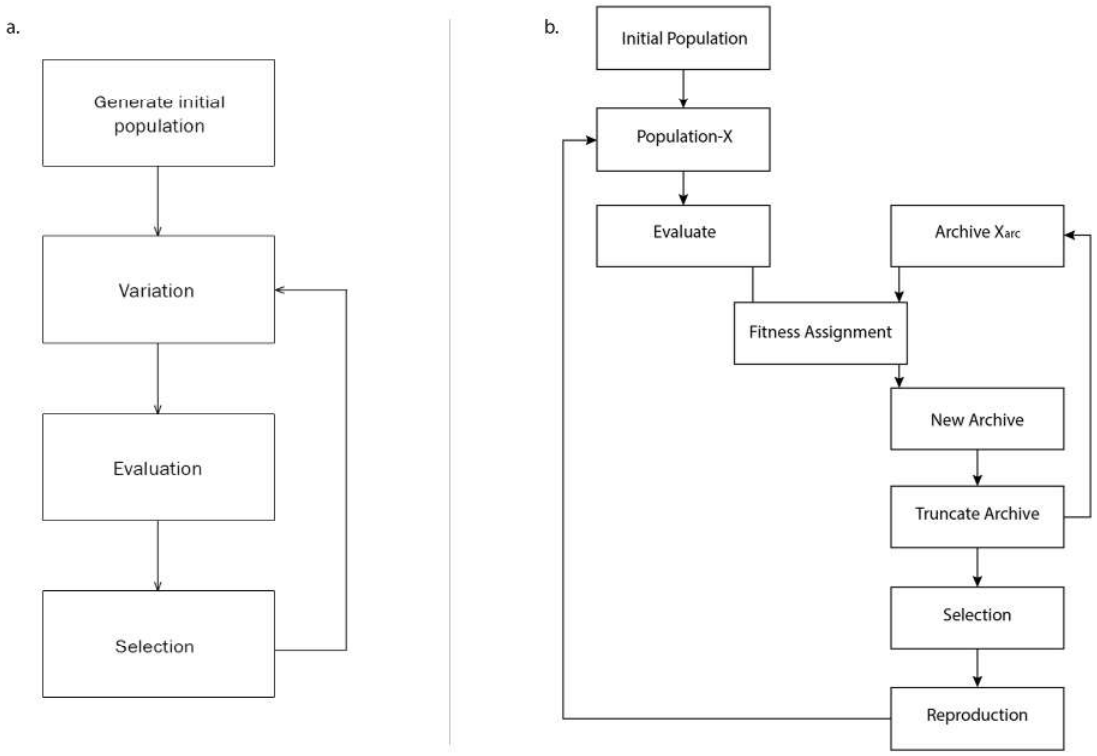
Therefore, the paper engages the application of an evolutionary model, through the utilization of evolutionary algorithms, to develop an urban patch that aims to adhere to several conflicting objectives by generating multiple optimal solutions rather than a single solution. Evolutionary computation and the principles that drive the field form the foundation of the experiments, as such, a description of the algorithmic process is expanded upon to ensure a clear understanding of the factors that drive the experiment presented within this paper.

The Biological Argument

The conventional definition of cities in the past half-century has been formulated around treating a city as both a system that is independent from its environment and one that is usually in an equilibrium state. This top-down approach to cities reflected a process of planning and management; the master plan was implemented with the notion that once constructed, the city was perceived to be 'complete'. However, 'completion' was seldom achieved, as it was a substantially idealistic perception. The factors that dictate the growth rate and development of a city cannot be expressed and implemented through a 2-dimensional representation of location and space distribution. This has been proven in an array of examples that range in scale and timeframe. Two of which are Brasilia and Milton Keynes (Makki and Schizas, 2010). The former was designed in the mid 20th century to accommodate a population of 500,000 people, however by the year 2000, the population of Brasilia reached 2 million and has reached close to 3 million in 2014. Milton Keynes on the other hand was designed primarily as a poly-centric plan through the distribution of different business centers throughout the city; however, the unexpected rapid growth of one business center during the city's development resulted in the failure of the remaining business centers to compete, thus transforming the city into a mono-centric one.

Such unexpected outcomes are due to the fact that cities are governed by the stakeholders that comprise the city as well as the efficiency of the networks and flows between these individuals. Thus, rather than approaching cities as machine systems, Batty (2013) contends that a city must be considered as an organism, a system that is ever-evolving, one that is in a perpetual dialogue with its environment, continuously adapting to changes dictated by the individual and group decisions that comprise the city. Brasilia and Milton Keynes exemplify the lack of control over the growth rate and final outcome of a

Figure 1. a.) The principal flow of evolutionary algorithms b.) SPEA2 Algorithm – to increase the efficiency of reaching a diverse optimal set, algorithms incorporated different techniques and variations to the basic interpretation of the principles of natural evolution. The evolutionary solver employed in the experiment implements the algorithmic flow diagrammed in figure b. (Reproduced from Weise, 2008)

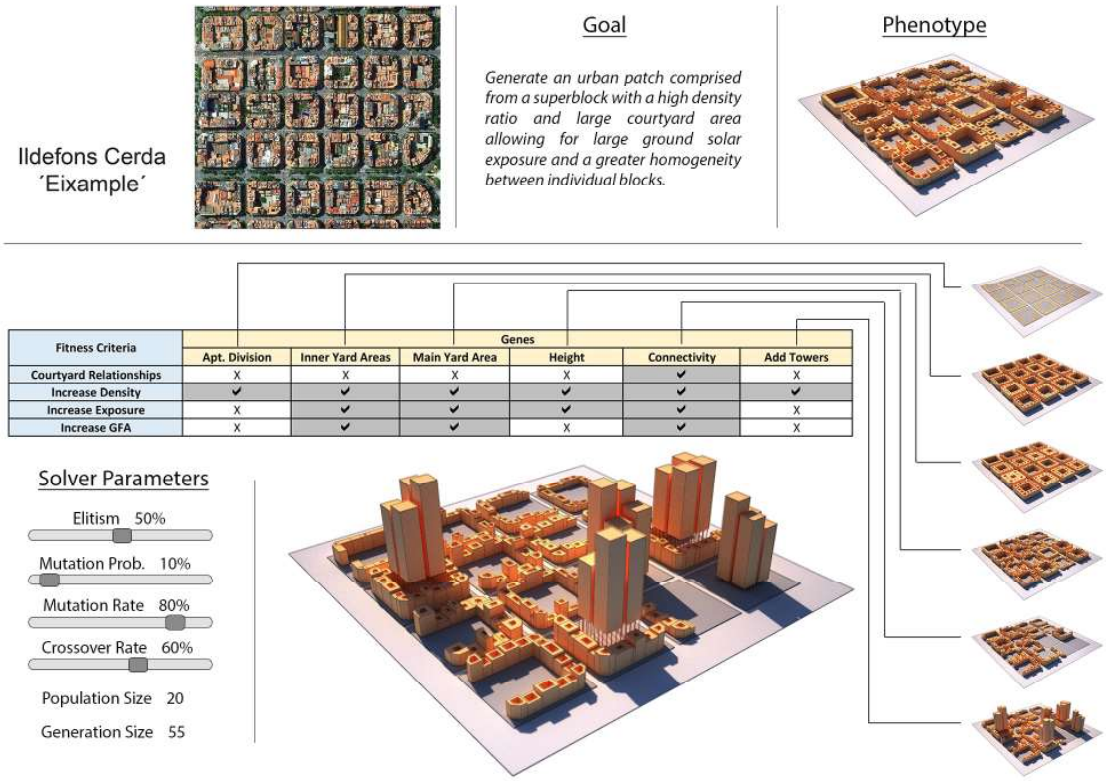


city; cities designed with idealistic goals that could only have been achieved were they in isolation from their environment.

In line with Batty's argument of approaching the city as an organism rather than a machine; understanding the relationship between a biological natural system to its environment is crucial in translating the factors that govern the evolution of natural systems towards city growth and development. Contrary to the conventional planning methods of the 20th century, natural systems do not evolve towards a predefined goal, as this deems the system to be one that is self-contained; therefore, rather than optimization, natural systems evolve and develop through adaptation. Emphasis must be placed on the term *adaptation* as it greatly signifies the fact that the evolution of a natural system is completely dependent on the ability of the system to successfully transform itself and adapt to its environment. Ernst Mayr (2001) emphasized the significance of a natural system to adapt to its environment by attributing it as a relationship of "perfection", although the use of this term may be construed as a teleological one, Mayr clarifies that by perfection he means "the seeming adaptodness of each structure, activity and behavior of every organism to its inanimate and living environment" (Mayr, 2001, p163). The adaptation between a system and its environment is one of the corner stones of a biological model of evolution, as it results in an efficient exchange of resources between the two; thus the significance of a city's morphology to adapt to its environment (climatic, cultural, geographic, etc.) is crucial in developing the sustainable longevity of a city; further signifying the need for the shift from understanding a city as a machine to that of an organism.

Therefore, rather than attempting to predict and define the final outcome of a city's urban fabric, the application of an evolutionary model to generate design solutions that

Figure 2. Diagrammatic Summary of the application of the gene pool onto the phenotype, including a cross-reference between the genes and the fitness criteria highlighting the required transformations for the evolution of the phenotypes. Also summarized are the parameters driving the solver. The experiment was conducted with team members Ali Farzaneh (Architectural Association) and Diego Navarro (Universitat Internacional de Catalunya)



evolve towards fitter individuals to their environment serves as an efficient design strategy for a problem whose conflicting objectives necessitate multiple solutions rather than one single optimal solution. Back, Hammel and Shwefel (1997) argue that "the most significant advantage of using evolutionary search lies in the gain of flexibility and adaptability to the task at hand", and while the optimal solution for a single objective problem is clearly defined, multiple objective problems require the "robust and powerful search mechanisms" (p.13, Zitzler, 1999) of evolutionary algorithms to find the fittest solution candidates that take into consideration all of the assigned objectives.

The Evolutionary Strategy

Evolutionary Algorithms have been used extensively in recent years to mimic the principles of evolutionary science to solve common real world problems through search and optimization procedures of single or multiple objectives. Ranging from the fields of economics to politics and music to architecture, evolutionary algorithms have proven to be an efficient problem solving technique to find multiple trade-off solutions for problems that possess multiple 'fitness criteria' (objectives) that are in conflict with one another.

Although evolutionary algorithms are derived from evolutionary principles, the algorithmic process by which a population of individuals 'evolve' towards a local or global optimum may be viewed as a teleological process that is driven towards an end goal.

There is yet to be a consensus to justify this fundamental difference between the algorithm and its biological counterpart; some authors in the field attribute it as a "change in semantics" (p.48, Weise, 2008), while others outline the process of evolutionary algorithms as one that is similar to the "selective breeding programs of animals and plants" (p.5, Paterson, 2002), rather than one that attempts to evolve new species or employ natural selection (Paterson, 2002). However, De Jong (2006) argues that if an evolutionary system is viewed as a "complex, adaptive system that changes its makeup and its responses over time as it interacts with a dynamically changing landscape," then an evolutionary algorithm is represented as a "feedback control mechanism responsible for maintaining some sort of system stasis in the face of change" (p.23, De Jong, 2006). Therefore, when comparing the local optimum in an evolutionary algorithm to a biological evolutionary process, Weise (2008) argues that achieving the local optimum in an evolutionary algorithm corresponds to a "well-adapted species that dominates all other animals in its surroundings" (p.3, Weise, 2008).

Nevertheless, several applications of an evolutionary model as a computational process have been developed throughout the mid-20th century; the most prominent of these algorithms were Rechenberg and Schwefel's 'evolutionary strategies', Fogel's 'evolutionary programing' and Holland's 'genetic algorithm' (De Jong, 2006). Although each of these models have been founded and developed almost independent from one another, the establishment of several evolutionary algorithm (EA) conferences in the 1990's resulted in highly beneficial interactions between the domains of evolutionary computation. De Jong (2006) clarifies that "the result of these first interactions was a better understanding of the similarities and differences of the various paradigms, a broadening of the perspectives of the various viewpoints, and a feeling that, in order to continue to develop, the field as a whole needed to adopt a unified view of these evolutionary problem solvers". *Figure 1a* illustrates the basic principles associated with evolutionary algorithms.

The 'integration' of different evolutionary paradigms, as well as the challenge associated with finding a solution to mul¬¬tiple conflicting objectives, led to an upsurge in different evolutionary algorithms. Each employed a different evolutionary strategy driven by a different interpretation of evolutionary principles with the ultimate objective of achieving the most optimal solution-set to a problem in an efficient timeframe. However, the two basic evolutionary principles of selection and *variation* remain the main driving force behind most evolutionary algorithms. Zitzler (1999) explains that:

"In evolutionary algorithms, *natural selection* is simulated by a stochastic selection process. Each solution is given a chance to reproduce a certain number of times, dependent on their quality. Thereby, quality is assessed by evaluating the individuals and assigning them scalar fitness values. The other principle, *variation*, imitates natural capability of creating "new" living beings by means of recombination and mutation."

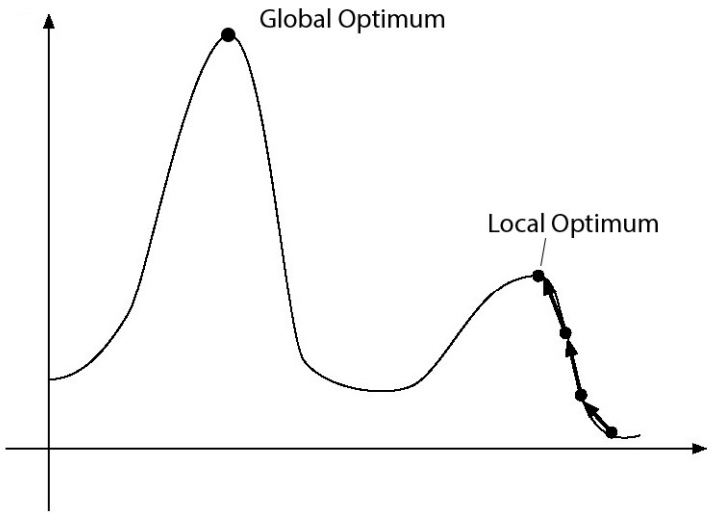
The progression of different evolutionary strategies over the past few decades has revolved around the efficiency of an algorithm to apply these two basic principles in order to achieve the two most fundamental objectives of multi-objective optimization (Zitzler, 1999):

- Application of the most efficient assessment and selection methods to achieve the optimal set of trade-off solutions – the *Pareto optimal* set.
- Maintain a diverse population throughout the simulation run in order to minimize the probability of premature convergence as well as maintain a dispersed Pareto optimal set.

Thus, the methods by which different evolutionary strategies apply the principles of selection and variation are notably diverse in different evolutionary algorithms. However, the most progressive evolutionary algorithms (e.g. NSGA-2, SPEA-2) excelled through their ability to achieve the most diverse Pareto optimal set in both an efficient timeframe as well as a reasonable computational environment (Luke, 2014). As such, the algorithm associated with the evolutionary solver utilized (Octopus 3D) for the following experiments is the Strength Pareto Evolutionary Algorithm 2 (SPEA-2) (*figure 1b*).

As the biological paradigm may be perceived as foreign to many designers, a brief description of the terminology interpreted within the solver is crucial for a comprehensive

Figure 3. An abstract 2-dimensional single objective optimization fitness landscape



understanding of the experiment carried out in the following chapter (the following definitions correspond to their relevance within the CAD software and therefore are not to be interpreted as the biological definitions of the terminology):

- *Generations* – The number of iterations per simulation run.
- *Population* – The number of individuals per generation.
- *Phenotype* – The geometry onto which the simulation will run.
- *Gene* – Parameter that controls the intensity by which the phenotype is modified.
- *Fitness Criteria* – The criteria by which the phenotype will be evaluated and selected.
- *Mutation* – Random modifications to the gene pool.
- *Mutation Rate* – The intensity of the mutation.
- *Mutation Probability* – The probability of a gene to mutate.
- *Crossover* – Exchange of genes of different phenotypes.
- *Elitism* – The number of dominant solutions selected to generate the next population.
- *Pareto Front* – The most optimal solutions in the population.

Experiment

Experiment Setup

Contrary to a single objective optimization algorithm, the use of evolutionary population based algorithms empowers the possibility to modify, evaluate and select a set of candidate solutions per each iteration rather than a single solution. Thus avoiding the conventional preference based approach that required the solver to "convert the task of finding multiple trade-off solutions in a multi-objective optimization (*problem*) to one of finding a single solution of a transformed single-objective optimization problem" (Deb, 2001, p.7). Therefore, the following experiment utilizes Ildefon Cerda's unique Eixample block as the main component that comprises the 16 block *phenotype* onto which the solver will run. The experiment's objectives aim to generate an urban patch that achieves an efficient courtyard relationship, a high density ratio, a high ground solar exposure ratio and an increase in the size of courtyards. To accomplish this, the gene pool detailed in *figure 2* transforms the phenotype's morphology through modifications to courtyard size (main courtyards and inner courtyards), building heights, unit divisions and courtyard connectivity between individual blocks. In addition to this, the genepool also allowed for the emergence of towers, should the solver find it a viable solution to generate higher density ratios while simultaneously maintain large open areas.

Unlike single objective algorithms, each individual in the population is evaluated according to each fitness criterion independent from one another (*figure* 2). Therefore, the same individual may score a high fitness value in one criterion, while simultaneously score a low fitness value in relation to another fitness criterion. Therefore, the *Pareto optimal set* – the fittest individuals in the population that are not dominated by any other individual, is comprised from a diverse set of individuals that are all considered to be optimal solutions within the population (Deb, 2001).

Solver Setup

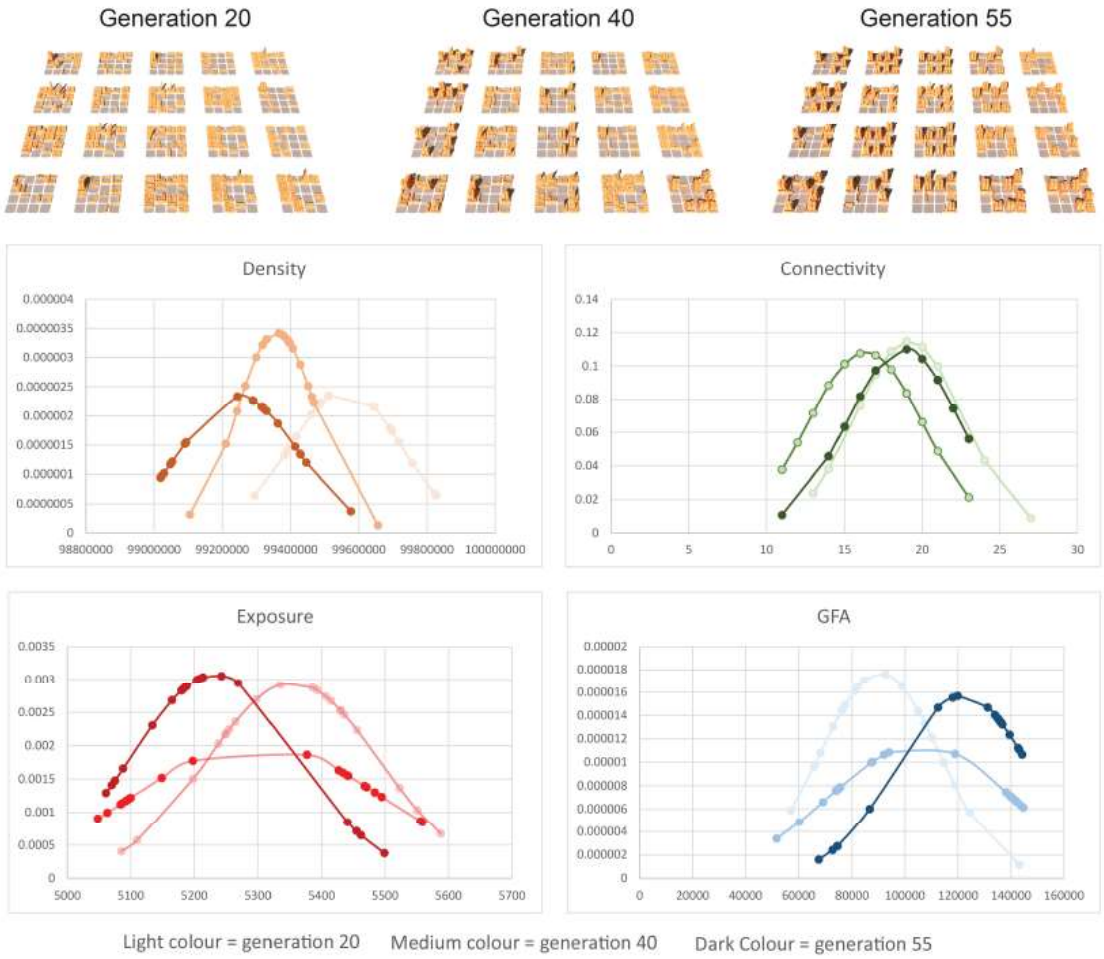
Although the algorithm mimics natural evolution by incorporating variation and selection strategies to *evolve* the population towards an optimal solution set, the intensity of their application plays a pivotal role in generating a diverse solution set within an efficient timeframe. Ideally, the algorithm setup should balance a search and optimization strategy that is both *explorative* – adequate mutation and crossover to allow for a diverse population of candidate solutions; as well as *exploitative* – employing an efficient selection and variation strategy that directs the algorithm towards an optimal solution set within a feasible number of generations (Luke, 2014). This is best represented through a 2-dimensional single objective optimization fitness landscape (figure 3). Depending on the complexity of the *fitness landscape*, what may be initially perceived as the optimal solution is in reality a local optimum. Therefore, in order to avoid the solver converging towards a local optima, the biological parameters driving the algorithm are modified throughout the simulation to achieve the most efficient balance between exploration vs. exploitation.

To ensure the population in the simulation *evolves* towards one that is both diverse as well as optimal, the solver parameters are set to the following: An elitism value of 50% is implemented which ensures half the population is bred from the most optimal solutions while the other half is randomly bred from the remaining solution candidates. A high mutation rate coupled with a low mutation probability, complimented with a moderate crossover rate ensures adequate variation is applied to the individuals in the population to generate diversity while simultaneously evolving the population towards 'fitter' individuals. However, constraints to the computational environment limit the experiment to a population of 20 individuals and a simulation run of 20 generations (*figure* 2).

Experiment Results

The simulation was interrupted, analyzed and modified at three stages throughout the experiment; generation 20, generation 40 and generation 55. The conflicting objectives set in the experiment aimed to ensure a diverse Pareto optimal set was achieved while simultaneously converging towards the global optima. At each 'analysis point' in the simulation, the objectives driving the experiment were modified in response to the fitness results of the phenotypes. At generation 20, the objective optimizing for larger courtyards was suppressed as it was evident that three of the four objectives (courtyard connectivity, courtyard area and ground solar exposure) complemented one another and thus have directed the simulation towards early signs of premature convergence. As a result, at generation 40, towers emerged throughout the majority of the individuals within the population. Rather than achieving a high density through a uniform height distribution within the population, the independent evaluation of each fitness criterion run by the solver generated an array of geometric diversity within the population. Finally, at generation 40, the objective optimizing for large courtyard areas was reintroduced to the simulation, while the objective optimizing for ground solar exposure was simultaneously suppressed. The results of which showed a significant shift in the population towards individuals that comprised predominantly from towers. Eliminating the objective optimizing for solar exposure allowed for a spike in towers and thus an increase in the density ratio as the overshadowing on ground level no longer played a role in the experiment (figure 4).

Figure 4. Geometric and Statistical comparison of the results of the fitness values of the three generations analyzed. As with most evolutionary algorithms, the fitness of an individual is determined by its proximity to '0'. In the results above, density and exposure have optimized throughout the simulation, while connectivity has maintained a relatively uniform fitness throughout. Finally, as a result of suppressing the objective optimizing for large courtyards (gfa) early on in the experiment, the fitness values of courtyard areas have decreased throughout the simulation.



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Conclusions

The distinct evolution of phenotypes from a population comprised from low rise geometry, to one predominantly comprised from towers may be viewed as the extinction of one species and the emergence of another. The solver attempted to generate the most optimal solutions to the objectives defining the experiment, thus the Pareto optimal front was directed towards a phenotype that utilized open spaces and high density towers to achieve high fitness values relative to all of the analysed criteria. However, the fitness values of the four objectives did not achieve a uniform increase in fitness throughout the simulation. Although this was partly due to changes applied to the objectives at different stages in the experiment, it was also a result of the limits imposed by the computational environment which constrained the simulation to a small population and generation count, consequently restraining the results to a limited solution set. Although alterations

to the parameters driving the solver at different stages throughout the simulation play a significant role in directing the experiment towards diversity and optimization, the length of the simulation is pivotal to ensure that the applied changes manifest themselves in the population.

Further Applications

The foundations of evolutionary computation have been significantly contingent on the principles of evolution established in the modern synthesis in the 1940's. Although evolutionary algorithms apply key principles of an evolutionary model within a computational environment, these principles reflect phenotypic variations through statistical gene frequencies in populations (Carroll, 2008). However, the advancements in the field of evolutionary development in the 1980's pertaining to the effect of mutations of gene regulation and regulatory sequences on the evolutionary process of organisms is severely lacking from the field of evolutionary computation. Although the discoveries in developmental biology have greatly challenged the principles established in the modern synthesis, these discoveries are yet to manifest themselves in genetic algorithms, thus resulting in an incomplete translation of how evolution functions on the genetic level and consequently an incomplete portrayal of a biological evolutionary model through evolutionary computation. Preliminary experiments carried out at incorporating algorithmic gene regulation on a simple phenotype have yielded successful results in generating a significantly diverse population in an efficient time frame. However, a thorough application of modern evolutionary principles within the field of evolutionary computation is yet to be realized.

References

Back, T. and Hammel, U. and Schwefel, H. P. (1997) Evolutionary Computation: Comments on the History and Current State. IEEE Transaction on Evolutionary Computation, 1(1), pp. 3-17.
Batty, M. (2013). *The New Science of Cities*. (MIT Press, Cambridge).
Batty, M. and Marshall, S. (2009). Centenary paper: The evolution of cities: Geddes, Abercrombie and the new physicalism. *Town Planning Review*, 80(6), 551-574.
Carroll, S. (2008). Evo-Devo and an expanding evolutionary synthesis: A Genetic Theory of Morphological Evolution. *Cell*, 134(1), 25-36.
De Jong, K. (2006) *Evolutionary Computation* (MIT Press, Cambridge, Mass).
Deb, K. (2001). *Multi-Objective Optimization Using Evolutionary Algorithms* (John Wiley & Sons, Chichester).
Luke, S. (2014) *Essentials of Metaheuristics*. 2nd ed. s.l.:Lulu.
Makki, M. and Schizas, P. (2010). *Urban Metabolic Growth.* Graduate. Architectural Association.
Marshall, S. (2009). *Cities Design and Evolution* (Routledge, Abingdon).
Mayr, E. (2001). *What Evolution Is* (Basic Books, . New York).
Paterson, N. (2002). *Genetic Programming with Context-sensitive Grammars.* PhD. University of St Andrews.
Weise, T. (2008) *Global Optimization Algorithms - Theory and Applications*. 2008-1-4 (ed. s.l.:Weise).
Zitzler, E. (1999) *Evolutionary Algorithms for Multi-Objective Optimization: Methods and Applications* (ETH, Zurich).

Neo-Liberalist Political Ideology as Influencing factor in Transformation of Indian Urban Form

Rupali D Kavilkar, Ravindra Deshmukh
Department of Architecture, Gogte Institute of Technology, Belgaum
ndian Institute of Architecture and Planning , Mangalayatan University, Aligarh
Keywords: Neo Liberalism, Political Ideologies, Indian Urban form, Bangalore city, Hyderabad city

Abstract

The urbanization process in India as elsewhere has catapulted cities as engines of national development. The Indian urban system was dominated by four metropolitan cities: Mumbai (Bombay), Delhi, Calcutta and Chennai (Madras). The opening up of the Indian economy since 1991 has stimulated the development of other cities, such as Bangalore, Hyderabad and Pune and led to the creation of new hubs of urban growth centered on the manufacture of computer software, electronics etc. Significant studies indicate that the transformation of core centered form of Indian cities to polycentric form, also include change in land uses, urban sprawl, infrastructure development, transportation facilities, changing sky-scape and formation of new centers at peripheries. The study in the paper puts forth that the neo-liberalist ideology with economic reforms in 1991, change in policy from State or Government controlled development to decentralized one of private, public partnership, opening up to foreign investment have brought challenge meeting dimension to urban infrastructure development, housing sector, growth of IT sector etc. The paper concludes that the size and location of these developments, types of activities, their sources –central government/state government/private Indian Company/Foreign Company are indicators of the extent of effect of neo-liberalist ideology on transformation of Indian urban form.

Introduction

Urban development in India is neither unique nor exclusive but is similar to a worldwide phenomenon. Post Independence, Indian cities have witnessed exponential growth. It is observed in change in land uses, high densities, urban expansion, decentralized growth, changing urban eco structure and social interactions. Many factors have been reasons for this rapid urban growth in India. According to the 2011 Census, the urban population grew to 377 million showing a growth rate of 2.76% per annum during 2001-2011. The level of urbanization in the country as a whole increased from 27.7% in 2001 to 31.1% in 2011(Bhagat 2011). The urban population is currently 31% of the total population and it contributes over 60% of India's GDP. It is projected that urban India will contribute nearly 75% of the national GDP in the next 15 years. Cities are accordingly referred to as the engines of economic growth.

Research Area

The current paper studies the growth and transition of urban form of Indian cities. It studies the ideological shift from of Socialism to Neo-liberalism, and the influence of these on urban form of Bangalore, Hyderabad.

Research Questions

The question is what the all-encompassing political ideologies, their decisions in the form of policies and strategies trigger effects on urban development. Have these policies, economic reforms under government assistance been instrumental in this city's transition?

Methodology

The research includes, literature study of books, thesis, journal papers, Government records and reports. Discussions, interviews were also conducted with professionals, experts in different fields, viz. Political Science, Academicians, Planners, IT professionals, Government officials, Bureaucrat, policy makers, etc. discussions and observations were recorded /documented and used for analyzing urban growth patterns. Site visits to different cities included study of indicators of urban growth pattern. The analysis of the current paper is carried in two different sections. The first section identifies the shift in political ideologies from socialist to neo-liberalist ideology and the key initiatives, reforms that emerged. The second section studies and analyzes the effect of this shift on transition of urban pattern of two Indian cities, which have recently been declared as Metropolitan cities. The study provides an extra layer of insight on the analysis of growth of Indian cities, which can be useful for policy makers and planners to anticipate and forecast future changes.

Background

At the end of colonial rule and the beginning of democratic government, many colonial ideologies percolated into the new government policies. The Indian Government had a vision to have a constitution suitable for the Indian context guiding through a system of ideals, and to present to the world India as a secular country open to progress. It was envisaged that the major cities, which emerged as centers of colonial operation of surplus appropriation, would continue to be the center of economic operation and as a result these cities drew a large population while the rural-urban migration got intense with aggravating agrarian distress. At the same time, urban centric development model gave rise to many emerging cities.

And in the mid '90s, with the introduction of new economic policies it was envisaged that fast economic growth and modernization of infrastructure of the cities would get rid of the urban under-development. This 'lack of public sector funding' legitimized the entry of private capital in urban development. Linking the country with the global economy has led to a rise in indigenous investment and an inflow of capital from outside the coun-

try. Since many of these investments have been positioned either within or around the existing urban centers, it is reasoned that they have given an impetus to the pace of urbanization by causing a significant increase in employment opportunities in the cities and strengthening the pull factors attracting migrants.(Kundu 2011)

Indian Political Ideologies

The ideologies laid down are Sovereignty- that is State's power to take decisions without any influence of power. The term Socialist, included in 1976 in the 42nd amendment to the Constitution, means commitment to attain ideals like removal of inequalities. Secularism implies that in India there will be no state religion. Democratic is type of government of the people, by the people and for the people.

The first Prime minister of India, Jawaharlal Nehru, dreamed a secular state, based on social and economic justice. By favoring a program of Modernist Architecture for the Chandigarh city design and the Capitol complex both designed by French architect Le Corbusier, Nehru consciously incorporated International Modernism in public Architecture in a bid to look to the future rather than past, to demonstrate both its independence from European culture and its ability to perform functions of a modern state. The Open hand monument in Chandigarh was used to as a symbol to demonstrate the government's openness. The Assembly Hall in Chandigarh is built in International Modernist style to show India's openness to progress and be a part in the international scenario. This was in contrast to the Parliament House, New Delhi, designed by Sir Edwin Lutyens, which was designed using elements of Hindu, Muslim and Buddhist Architecture.

Infrastructure development in post-Independence India is essentially parallel to economic planning, in four distinct political eras, as the eras of Nehru (1950-67), Indira Gandhi (1967-84), Rajiv Gandhi (1984-91), and the era of Decentralized Politics (1991-2004). Table 1 attempts to explain the essential differences in the political posture, policy focus and approach to macroeconomic management over the four political economy eras post-independence. Each era represents a distinct political tone, and hence, a different emphasis in the corresponding Five Year Plans and a different approach to economic policy. Over the Nehru, Indira and Rajiv eras, the Congress Party was the dominant force in the realm of national politics. The post-1991 era is characterized by a marked increase in decentralization of political power at all levels of government. Hence, it has been described as the era of Decentralized Politics (Dhar 1987).

Socialism in India (1970-1980)

Socialism is essentially a humanitarian ideal, advocating collective ownership, collective welfare, ordering by means of production and distribution. Socialism prioritized notion of equality; therefore distribution, use of social funds, public participation, inclusion concepts, etc. (Kumar 2011). Democratic socialism in India aims at creating an ideal "welfare state", classless society, with no class conflict, regional and religious rivalry. It

Table 1. Political eras and focus

Era	Political Orientation	Policy Focus
Nehru (1950-67)	Fabian Socialist	Industrialization, pro-public sector and Central Government bias
Indira Gandhi(1967-84)	Rhetorical Socialist with anti-urban bias trending to populist	Food security, anti-private sector, import substitution
Rajiv Gandhi (1984 - 91)	Populist	Industrial de-licensing and deregulation, technological modernization
Decentralized Politics (Post-1991)	Neo-populist (Coalition based)	Structural economic reforms, globalization

aims at following a middle course between one extreme of individualism cum capitalism and the other extreme of communism cum totalitarianism.

Liberalism (1992 onwards)

Liberalism is an economic ideology that tends to make a self- regulating market. Political liberalism is one way of applying the principles deduced from these economic doctrines to political life (Amable 2011). The economic reforms of 1990 have included significant industrial and trade liberalization, financial de-regulation and policies favorable to privatization and foreign direct investments. This has brought about globalization triggering software development services, outsourcing industry, modern information communication and entertainment technologies.

Policies and Strategies

While socialist policies prioritize distribution, and therefore use social funds, micro credit arrangements to employ and empower the citizens; the neoliberal policies prioritize accumulation, and therefore use tax breaks, regulatory rollbacks and the repression of organized labor to attract and retain direct foreign investment. (Goldfrank and Schrank 2009) Policies initiated to make Indian cities more competitive in global circuit triggered dynamism in urban context, bringing large scale Public Private Investments in construction industry and infrastructure development sector. These included construction of public amenities like roads, flyovers, bridges, public spaces, metros etc. New policies that influenced urbanization are:

- Privatization of public services in transportation, infrastructure, entertainment and industrial sectors.
- PPP model opened new concepts of partnership between and private and the state like BOT (build–operate–transfer), BOOT (build–own–operate–transfer),BOO (build–own–operate), BLT (build–lease–transfer).
- Share of Foreign investment in land and housing market shift in priorities: bringing in global economy and development forces.
- Modification of byelaws, FSI, planning norms: to suite the new trends of development. Special economic zones, Neighborhood Townships, IT parks etc. mushroomed in most Indian metropolitan cities.
- Housing market privatization: private companies providing housing has reduced the pressure on the government of providing for the acute housing demand. This has created huge demand in land, transforming the real estate market.

Socialism versus Neo- Liberalism

In the neo-liberal view of society, the market is opposed to the state: the market is the realm of freedom, whereas the state is the realm of power (principled on Socialist Ideology). The market could not have existed without the state (Gosme 2002). Table 2 compares the policies and influence of the shift in ideology.(Kavilkar 2013)

Over time, India has shifted from a reluctant pro-capitalist state with a socialist Ideology to an enthusiastic pro-capitalist state with a neo-liberal ideology. This shift has significant implications for the development of cities in India (Kohli 2007). Post Liberalism, urbanization is characterized as a product of activities, which included commercialization, improved production, and accessibility to various markets, improved services and infrastructure facilities. These directly affected living standards of dwellers in the Indian cities as increase in individual income; change in lifestyle, availability of qualitative services, etc. (Sekhon 2011). Indian cities are characterized by striking duality, Fig. 1. (2012) between socialist ideology based on the concept of equality, distribution etc. and market driven Neo-liberalist ideology based on the notion of individualism, freedom, etc.

Neo Liberalism has:-

- Accelerated the growth of cities, leaving its impact on land use pattern, growing

Table 2. Neo –Liberalism versus Socialism

Socialism		**Neo –liberalism**	
Characteristics	Policies	Characteristics	Policies
Constraints	State ownership production	Freedom	Allowed free enterprises and individual liberty.
Closed	Controlled through state decisions	Open	To new development , privatization
Rigid		Flexible	
Past, old fashioned		Future, novelty	Open to new and global trends.
Group, Collectivism	Co-operative and state ownership	Individual, individualism	Capitalist ideology allowing private growth and individualism.
Developed Housing schemes by public sector (state or central Government) for Economically Weaker Sections, slums, similar matchbox like apartment buildings into uniform cityscape.		Developed new land uses patterns like entertainment, market, infrastructure, and facilities of communication and c hanged the shape, cityscape, expanded urban areas, decentralized, blurred of urban-rural borders.	
Provision and compensation for slum dwellers. Broaden tax base, subsidies for agriculture sector, employment programs - pro labor, labor unions, provision for loans, grants to encourage small-scale industries, business, co-operatives. Central/State Government managed and provided infrastructure, like transportation, health, education, communication, facilities. Thus limiting the private sector involvement to minimum.		Uses tax breaks, regulatory rollbacks the repression of organized labor to attract and retain FDI. Policies that influenced urbanization are: Modification of byelaws, FSI, planning norms. Land use conversion. Housing market Privatization of public services, Share of FDI in land and housing market shift in priorities.(Planning Commission GoI 2011).	

urban densities, functional performance of new buildings, urban economic structure and social interactions. (S Sonar 2012)

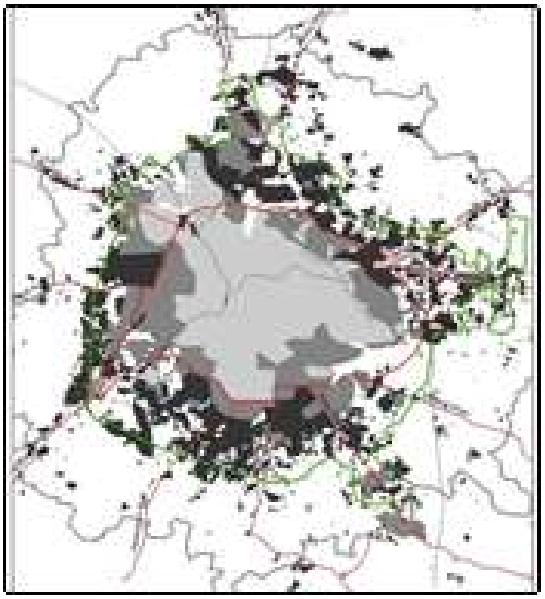
- It is slowly and steadily moderating the cityscape like expansion of urban areas, decentralization trends and attraction of rural areas, blurring of urban and rural borders.
- Made urban areas to grow more poly centers feasible due to technological ad vancement in transportation and communication.
- Has opened new avenues like neighborhood townships, IT cities, communication centers like airports, station, entertainment centers, leisure services, etc.

Case study 1- Bangalore City

Bangalore is one of the fastest growing metropolitan city in India, being the principal administrative, cultural, commercial, industrial, and knowledge capital of the state of Karnataka. The city enjoys a pleasant climate. Its tree-lined streets, numerous parks and abundant greenery have led to it being called the 'Garden City' of India. Bangalore

Figure 1. Bangalore city scape – city with influences of Socialism and Liberalism

Figure 2. IT corridor on SE and E direction



saw an influx of population migrating to the city and the steep population rise in the decade 1941-1951(Maiti 2009). Population growth during the 1970s could be ascribed to numerous public sector industries that came up during the period and fuelled significant immigration.

After the reforms were initiated in 1991, focus rapidly shifted to private industry and were supported by local governments, regulations and relaxed land-use zoning laws making way for the large technology parks. Most technology parks were established outside the limits of the city creating satellite townships; isolated from the urban fabric of the main city in the process converting open land into non-agricultural land.

Growth of Bangalore City

The development of the Bangalore metropolitan area can be distinguished into three concentric zones. The first zone comprises the erstwhile city corporation area of 226 sq. km.

The I.T. Corridor Scenario

The role of the government is one of the main factors for the region's economic success, paving the way for creation of an economic development. The I.T. Corridor is an initiative of the public authorities, dedicating 140 km2 of the East and South Eastern portions of the city. It included setting up high-end infrastructure necessary for technology industries includes laying arterial roads, developing open spaces, offer greater tax breaks, Software Technology Parks of India (STPI), low interest rates for financing and providing efficient means of public transportation. This has attracted IT companies and technology parks to be developed in this area, making Bangalore known as "Silicon Valley". The form of the city has expanded towards Southeast and East direction housing Whitefield area. The shifting of airport to Devanahalli in Northwest direction shows potential growth in this region. Fig 2 ((Raiborde Vivian 2015) All this has produced decentralized development, with zone 1 as "core" housing commercial, administrative and political areas, zone 2 as poly-centered i.e. having industrial, commercial, entertainment and or educational center.

Bangalore has transformed into a leading hub of information technology and software industry in India. Riding on the wave of globalization, it has rapidly emerged as the destination for outsourcing industries that deal mostly in the IT sector.

Figure 3. Changing Cityscape- Hyderabad city

Case Study 2- Hyderabad City

Hyderabad Metropolitan Area (HMA) broadly defined as the jurisdiction covered presently under Hyderabad Urban Development Authority (HUDA) and three Special AreaDevelopment Authorities (SADAs) (i) Cyberabad Development Authority (CDA), (ii) Hyderabad Airport Development Authority (HADA), (iii) Buddha Purnima Project Authority (BPPA). Fig 3.(Authority 2013)

Growth of Hyderabad City

The city has a star shaped layout and seems to grow along the main transportation arteries. The growth towards the Northwest, North, and Northeast is along the highway that connects the city to Mumbai, Delhi, and various districts headquarters respectively. Thus Urban- Industrial- Transportation development progresses hand in hand in these areas and this is a significant post- independence phenomena. These directions have thus been consistently pulsating with growth dynamics for the past almost fifty years. (JNNURM 2001)

The developments, contributed to the economic growth of the city and development of the spatial growth. The economy of Hyderabad is witnessing a transformation from traditional manufacturing and jewellery making towards a knowledge basedeconomy. This is primarily due to policies of the state government to promote knowledge sector and tourism through a series of initiatives and programs. Knowledge sector, including Information Technology and IT enabled services (ITES) along with the Biotechnology has gained momentum. The knowledge sector Corridor consists of: IT & IT enabled services, Biotechnology and medical sciences and Industrial technologies. The state is promoting key initiatives in this sector to leverage information technology to attain a position of leadership and excellence in the information age. The road map identifies "Hyderabad" as a thriving mega IT Hub with a significant number of top 500 IT companies having their presence in Hyderabad. In addition, the focus on IT enabled services has increased employment opportunities in this sector. Several initiatives have been taken up such as setting up of IT training institutes, development of a hitech city, e-governance initiatives, and encouraging private sector presence in Hyderabad's Software Technology Park, the Hardware Park, development of a Knowledge Park, and a financial district.

Hyderabad is emerging as one of the fastest growing Fig 4.(2015) IT cities of the country and is the fourth largest exporter of software products. The growth of exports had been phenomenal, year after year, achieving an annual growth rate of more than 80% during the last decade.

Table 3. Comparison between case studies

S.No	Urban Indicators	Bangalore City	Hyderabad City
1	Existence of Headquarters of several multinational corporations	Local and foreign MNC's of IT sector, BPO's electronic products, Aerospace and aviation, Bio-technology	IT companies, Electronics and Communication, Bio-Pharmaceuticals and Bio-Technology hub
2	Domination of the trade and economy of a large surrounding area	IT and Electronics sector- making it Silicon Valley of India	Traditional manufacturing, Knowledge industry, tourism industry , Film industry
3	Major manufacturing centers with transportation facilities	International Airport connected to other countries, lies on the golden quadrangle.	International Airport connected to other countries, road and rail connectivity to Pune, Chennai, Bangalore, and lies on North-South corridor.
4	Centers of new ideas in business, economics, culture and politics	Introduced economic reforms, International Tech Parks, and Special Economic Zones	Public sector in Bio-Pharmaceuticals and Bio-Technology called Genome valley, Fab-city, Nano-Teck Park
5	Centers of communications	Well connected	Well connected
6	Dominance of the national region with great international significance	Aerospace and Aviation manufacturing, services and education. Called Silicon Valley of India	Base of Indian Space Research Organisation. Since inception, it is global trade centre for pearls, diamonds, and handicrafts. Highest number of SEZ's in Indian cities. Global center of IT sector at Cyber-City or Cyberabad
7	Percentage of s employed in the services and IT sector	90% workforce in service sector.	90% workforce in service sector.
8	High-quality educational institutions, universities, international student and research facilities	Public Institutes-IIM,IISc, NIFT, Nimhans and universities for Engineering, Public and Privates sector Research and Development centers focusing in Electronics	Six State and three Central Universities, focusing on Engineering, Management, Medical and Economics. MNC's established R and D centers in Bio-Pharmaceuticals and Bio-Technology
9	Multi-functional infrastructure, network, entertainment facilities	Public -Private Partnership in road network and Metro network. The Karnataka State Government has provided many incentives and lucrative investment opportunities for Foreign investments, and multinational companies.	The planned Public Transportation System of Metro Rail relieves traffic congestions. A world class Metro Rail transportation facility built to transform Hyderabad into a global city.

Observations

Policies act as implementation tool of the political ideology/ strategy, and facilitator of urban development. Housing tyology, infrastructure develoment, communications, change in land uses, densities and urban area indicate and influence urban growth. The study identifies a set of urban indicators achieved by expert opinions (conducted through interviews and discussions). The urban indicators reveal the effect of Neo-liberalist strategies and policies.

A comparison between the two case studies with indicators of urban growth, reveal that the Indian cities like Bangalore and Hyderabad due to liberalist approach and policies are competing to strive to make a mark on the world map of global cities.

Conclusion

The paper concludes that the size and location of these developments, types of activities, their sources –central government/state government/private Indian Company/ Foreign Company act as indicators of the extent of effect of neo-liberalist ideology on transformation of Indian urban form.

It is summarized that political ideological shift from socialism to neo-liberalism, policies and strategies implemented have generated economic and urban transition of Indian cities like Bangalore and Hyderabad city.

The urban fabric is characterized by striking duality between effects of socialist ideology and concepts of equality, distribution with grants, subsidies provided for agriculture sector, housing loans, slum redevelopment projects etc. On the other hand, market driven neo-liberalist ideology based on individualism, capitalism with successful model of PPP, FDI and market incentives have turned Bangalore city from "Garden city" to "Silicon valley", Hyderabad from Pearl city to Cyberabad.

Gradual shift from socialist ideology to liberalist ideology has played an important role in the transition that Indian cities are witnessing. It has opened Indian cities to the global economic and development forces, launching urban India into the global arena. It has accelerated growth and affected the living standards of city dwellers.

References

Amable B. (2011)"Morals and Politics in the Ideology of Neo-liberalism" Socio Economic Review ,Vol 9,Aug 2011,3-30.

Authority, Hyderabad Urban Develoment (2013) GEO SPATIAL MODELING OF URBAN GROWTH PATTERN IN HYDERABAD USING RS , GIS AND AHP.

Amable, B. (2011) Morals and politics in the ideology of neo-liberalism. *Socio-Economic Review*, 9, 3–30.

Authority, H.U.D. (2013) GEO SPATIAL MODELING OF URBAN GROWTH PATTERN IN HYDERABAD USING RS , GIS AND AHP,

Bhagat, R.B. (2011) Emmerging Pattern of Urbanisation in India. *Economic and Political Weekly*, 46(34), 10–12.

Dhar, P.N. (1987) The political economy of development in India. I*ndian Economic Review*, 22(1), pp.1–18. http://ideas.repec.org/a/dse/indecr/v22y1987i1p1-18.html.

Gosme, S. (2002) Some Aspects of the Neo-Liberal Ideology. ATTAC, *London*, (June), 1–5.

Jawaharlal Nehru National Urban Renewal Mission, 2001. Hyderabad Urban Agglomeration : Demography , Economy and Land Use Pattern. *Hyderabad - City Development Plan*, 10–22.

Kohli, A. (2007) State and Redistributive Develpment in India. *United nations research Institute for Social Development*.

Kumar, P.A. (2011) Land in the Neoliberal Times : A Commodity or a Social Good ? *Journal of Indian Institute of Twon planners*, 8-2(June), 8–23.

Kundu, A. (2011) *Trends and processes of urbanisation in India*, http://pubs.iied.org/10597IIED.html.

Maiti, A. (2009) METROPOLITAN GOVERNANCE IN INDIA Part I - Definition of a Metropolitan Area. , (January), p.27. https://www.eastwestcenter.org/fileadmin/resources/seminars/Urbanization_Seminar/Paper_for_EWC_KMC_Workshop_by_K.C._Sivaramakrishnan__for_web_.pdf.

Planning Commission GoI (2011) *Urban Infrastructure, Housing, Basic Services and Poverty Alleviation_11th Five Year Plan*, http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v3/11th_vol3.pdf.

Raiborde, V. (2015) *GIS development*, https://sumangargi.files.wordpress.com/2013/05/bangalore1.doc.

Sekhon, B.S. (2011) Usefulness of Planning in Globalizing Cities : Aspirations and Achievements. *Journal of Indian Institute of Town planners*, 8(December-4), 76–89.

Sonar S. (2012) " Planning in Information Technology Era" ITPI Journal, Journal of the Institute of Town Planners, India, Vol 9, No 2, April –June 2o12, 26-33.
https://en.wikipedia.org/wiki/File:Bangalore_Panorama_edit1.jpg browsed in 2015
http://www.wikiwand.com/en/Hyderabad#/Cityscape browsed in 2015

Taming the sprawl: Growth of a peri-urban city and policy response

Samuel Dekolo, Leke Oduwaye, Immaculata Nwokoro
Department of Urban and Regional Planning, Lagos State Polytechnic, Nigeria
Department of Urban and Regional Planning, University of Lagos, Nigeria
Keywords: Sprawl, peri-urban, remote sensing, fractals, policy

Abstract

The concept 'peri-urban' remains elusive and often neglected by urban planners, however, this transitional zone is constantly under pressure by teeming population from the inner city or new entrants from the surrounding rural areas, thereby, resulting to an uncontrolled or unplanned landscape in most developing countries (Iaquinta & Drescher, 2000; Lawanson, Yadua, & Salako, 2012). Even though growth is inevitable and land use changes are imminent with peri-urban expansions of cities, the peri-urban space has a pivotal role in supplying agricultural resources like food and fruits for the survival of the city(Thebo, Drechsel, & Lambin, 2014). Understanding the development patterns, emerging urban forms and their attending impact on the peri-urban requires an understanding of development decisions(Lambin & Geist, 2007), this will help decision makers and urban managers develop appropriate policies to address growth 'edge' cities. This research focuses on the organic growth of Ikorodu, a peri-urban municipality in the outskirt of Lagos that rose from a sleepy farming community with a population of less than 100,000 people in the 1975 to a vibrant city of over a million residents in 2015. The study adopts multi-temporal remote sensing and GIS analysis to detect the urban pattern and emergent form for a 40 year period beginning at 1975 to 2015. An empirical analysis was also carried out by questionnaire survey of 300 land owners in 50 communities to determine the reason for the rapid growth and the response of planners to the city's growth.

Introduction

Urban growth in developing countries is dynamic and diverse; however, it is also disordered and disturbing. This growth is synonymous with sprawling fractals when compared to compact aggregations seen in the global north. The cost of this sporadic growth in rapidly growing metropolitan regions is enormous, as seen in the consistent depletion and diminution of high quality agricultural land and forests located in the peripheral areas of cities and rural areas by residential and manufacturing activities (Jiang, Deng, & Seto, 2013; Martellozo, et al., 2014). This process known as peri-urbanization largely takes place in the non-contiguous transitional zones between the rural areas and cities (Iaquinta & Drescher, 2000). It has attracted much research focusing on the peri-urban interface, land use change and agricultural economics (Bell & Irwin, 2002; Theobald, 2005; Buxton & Low, 2007; Lawanson, Yadua, & Salako, 2012).

Studies analysing urban forms, spatial patterns and the processes that drives these change can be traced back to early studies of North American and European scholars. Some examples are Burgess' concentric growth of cities inferred from the study of Chicago and Homer Hoyt's 'Sector Theory', which examined the influence of linkages and geographical features on city structure. Other studies include Christaller's 'Central Place Theory', which emphasises spatial equilibrium of urban structure and pattern; Harris and Ullman' 'Multi-Nuclei Theory,' emphasized the polycentricism of cities. However, since the 1990s studies on urban morphology have focussed on fractal geometry of cities (Batty & Longley, 1994; Frankhauser, 1994; Terzi & Kaya, 2011).

However, there are few studies investigating the morphological processes associated with peri-urbanization (Tannier & Pumain, 2005; Lagarias, 2007; Terzi & Kaya, 2011). These existing studies are attributed to scholars in the global north have not been able to address dissimilarities between the northern and southern countries in the speed, scope and experience of peri-urbanization (Fragkias, et al., 2012). Therefore, there is need for studies on peri-urbanization and morphological processes within an African context; this will close such gap in literature. Furthermore, empirical studies investigating the drivers and policy response of peri-urban growth for African cities are not well documented in literature. The study aims at detecting the urban pattern and emergent form of a non-contiguous peri-urban city in the outskirts of Lagos metropolis for a 40 years period beginning at 1975 to 2015. It also aims at identifying the factors responsible for the land use pattern and the response of land use planners to these emerging forms.

The Study Area

The study area Ikorodu, is a municipality (Local Government Area) in the outskirt of Lagos Metropolis located approximately 36km North East of Lagos between longitude 3.43° W and 3.7°w and latitude 6.68°n and 6.53°n north of the equator. Its area is approximately 396.5 sq. km, with land mass of 368.5 sq.km. Since its creation in 1968 as one of the five administrative divisions of Lagos State, Ikorodu has been known for its extensive farmlands. It houses several hectares of land acquired for farm settlements by the defunct government of Western Region of Nigeria and subsequently, approximately 180 sq. km (49%) of its landmass was zone for agricultural land use in the 1980-2000 Regional plan of Lagos State. While farming, fishing and trading, are basic sources of livelihood of indigenes, the location of the a 1,582.27 hectares industrial estate (the largest in Nigeria) by the Lagos State Government in 1976 has also served as a major pull factor leading to population growth. However, other pull factors include development of a light port terminal at Ipakodo, the expansion of the Lagos-Ikorodu road and the establishment of secondary and tertiary sector activities. The municipality recorded a 186% population increase between the 1991 and 2006 census years (i.e., from 184,674 to 527,917) and its present population is estimated at 1.5 million based on the United Nations Urbanizations Prospects projection for Lagos State, which is 12.9 million (United Nations, Department of Economic and Social Affiars, Population Division, 2014).

Figure 1. Map Showing the Study Area within the Lagos Metropolitan Area

Methodology

The use of fractal analysis has been widely used in the past three decades to understand urban patterns and morphologies. Fractals, which connote complexities, hierarchies, self-similarities, across scale and time has been helpful in the study of peri-urbanization processes (Batty & Longley, 1994; Tannier & Pumain, 2005; Thomas, Frankhauser, & De Keersmaecker, 2007; Lifeng, Fang, Zengxiang, & Xiaoli, 2015). Fractal analysis gives the description of the spatial arrangement of built-up areas as well as its quality. Highly fragmented built-up areas representing a sprawling pattern have low fractal dimensions, while compaction and regularity will attract a higher figure. Fractal dimensions may have figures ranging from 1 to 2 for simple geometrical objects and 0 to 2 for urban geometry similar to sierpinski carpets (Tannier & Pumain, 2005).

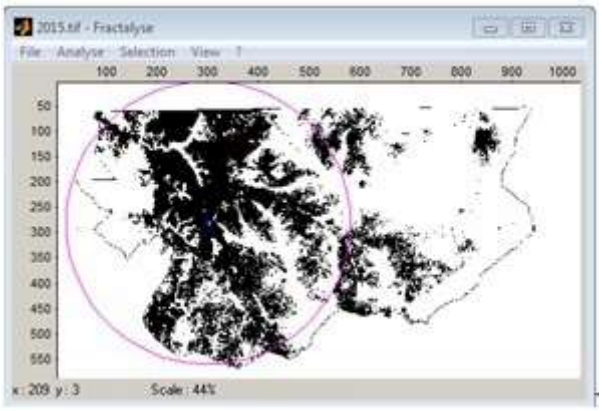
In this research, we adopted a 5-years interval multi-temporal analysis and data used were multi-spectral remote sense data for available periods (1984, 1990, 2000, 2006, 2011, and 2015). However, Landsat imageries for 1975, 1980, and 1995 were not available, therefore, Land Use/ Land Cover Map of 1976/78 was used to cover for 1975 and 1980. RGB composite rasters were developed from multi-spectral Landsat imageries and were further classified by means of ISODATA unsupervised algorithm.

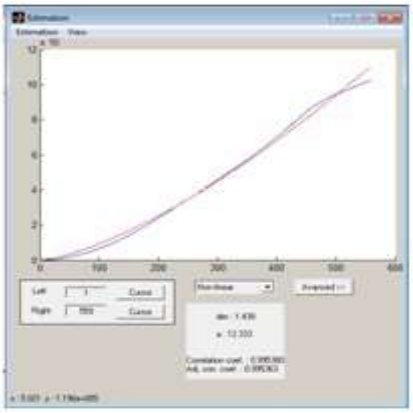
Built-up urban areas were extracted from ISODATA classified rasters by coding built-up pixels black and other classes of land cover types were coded white. The classified imagery were subsequently analysed for their fractal dimensions using software known as *Fractalyse* (*version* 2.3.2). The software uses different methods to measure fractal dimension, which in-

Table1. Data Source

Acquisition Date	Satellite Number	Sensor Type	WRS Path/Row	UTM Zone	Datum	Spatial Resolution (M)	Sources & Year
06/01/2015	Landsat 8	OLI_TIRS	191/55	31N	WGS84	28.5-30	USGS, 2015
03/01/2011	Landsat 7	ETM+	191/55	31 N	WGS84	28.5-30	USGS, 2011
07/12/2006	Landsat 7	ETM+	191/55	31 N	WGS84	28.5-30	USGS, 2006
06/02/2000	Landsat 7	ETM+	191/55	31 N	WGS84	28.5-30	USGS, 2000
27/12/1990	Landsat 4	TM	191/55	31 N	WGS84	28.5-30	USGS, 1990
18/12/1984	Landsat 5	TM	191/55	31 N	WGS84	28.5-30	USGS, 1984
Supporting Spatial Data/Demographic Data							
1976/78	Land Use/Land Cover Map						FORMECU, 1978
1980	The Lagos State Regional Plan (1980-2000)						Doxiadis Associates, 1980
	National Population Census 1963, 1991, 2006						NPC 1991, 2006

Figure 2. (left) Screen print of radial mass method in Fractalyse; (right) Screen print of fractal analysis 'D' estimation in Fractalyse





clude box counting, radius mass, dilation, correlation, etc. However, for this research, the radial mass measure was adopted in which analysis is done by iteration principle whereby the total number of built-up pixels are counted within the circle from a specific point known as the counting centre (for this research, the urban core area of Ikorodu shown in the 1976/78 land use map is the counting centre).

At each step, the radius r is gradually increased and the total number of occupied points *N(ε)* inside the circle is counted(where *ε* equals 2.*r* +1). The series of points obtained are represented by a Cartesian graph (fig. 3) with the Y-axis corresponding to the number of counted element *(N)* and the X-axis corresponding the value of the reference element *ε*.

The empirical curve of the plot is then fitted with the estimated curve; a good fit indicate fractality, however, the quality of estimation was verified by correlation coefficient. A non-linear regression derives the value the three parameter *a, D* amd *c*, where *a* is the Pre-shape factor and *c* is the point of origin on Y-axis (c = 0) (Tannier & Pumain, 2005). Thus, the fractal dimension *D* is determined by the following:

$$N=a\varepsilon^{D}+c \qquad (1)$$

Where

$$\varepsilon=2.r+1 \qquad (2)$$

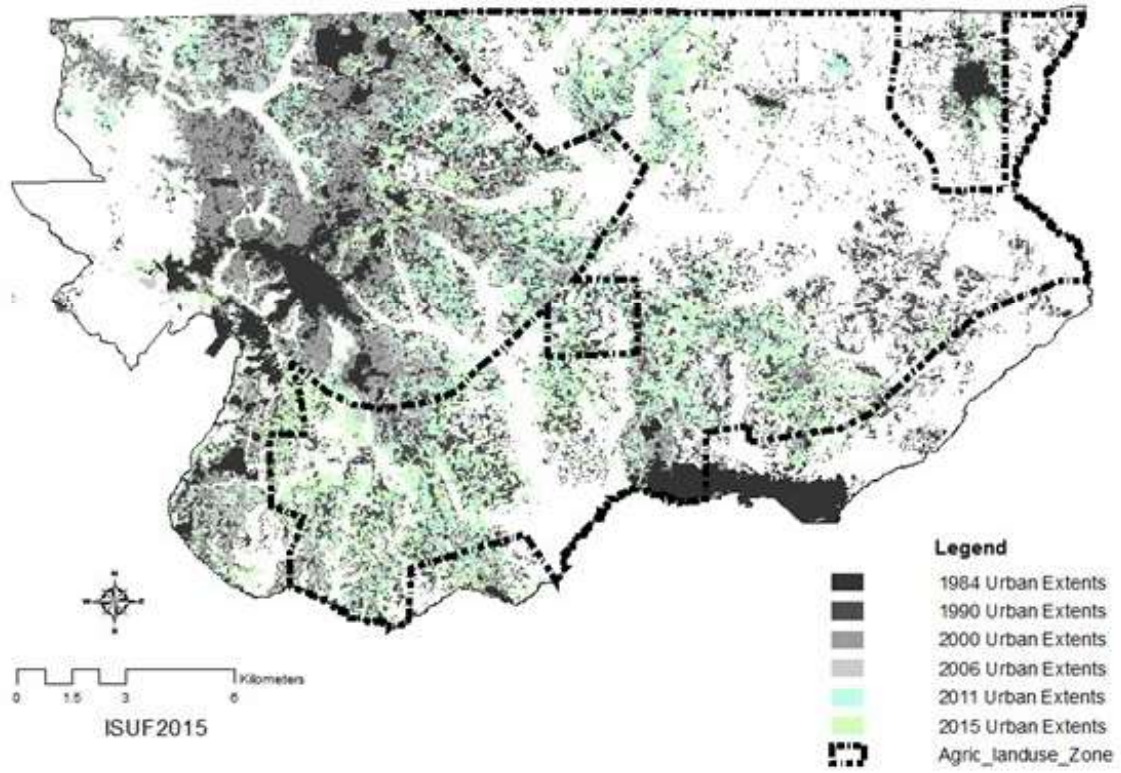
Fractal dimension values close to 2 indicates regularity and orderly development while values close to 1 or 0 as the case may be indicate a sprawling and leapfrog pattern of development. Furthermore, in order to ascertain extent of sprawling development in agricultural land, we extracted the urban extents layer in ArcGIS by intersect geoprocessing with the agricultural land zone of the Regional Plan of Lagos State of 1980. The relationship between fractal dimension and dynamics index of agricultural change was determined by regression analysis. We also calculated the dynamic index (Zhu & Li, 2003) for the change in allocated agricultural land by the following:

$$CDI=(U_a-U_b)/U_a \times 100\% \qquad (3)$$

Where *CDI* is the change dynamic index for a single land use *U* between initial period *a*, and final period *b*.

Urban morphology cannot be divorced from anthropogenic factors, therefore questionnaires were distributed to 300 house owners across 61 communities in the 6 Local Council Development Areas (LCDAs) of the study area to determine the drivers of the land use change as well as the effectiveness of existing land use planning policies managing or taming the sprawling pattern of development. The total number of house owners identified by the Lagos

Figure 3. Map of Ikorodu Showing Urban Growth and Extents in Agricultural Zone (1984-2015)



State Government for Land Use Charge was 89, 609 in 2012 (Lagos State Government, 2013), however, this would have increased. Questions were asked on the motivation for developing in the peri-urban municipality, type of land use, time of property development, and awareness of planning regulations and the development control agencies restraints or approval of their home construction. 270 house owners (i.e. 90%) responded and data was analysed using SPSS and Excel. We adopted factor analysis to determine key drivers of urban morphology, the suitability of our data was examined by the use Kaiser-Meyer-Olkin Measure of Sample Adequacy (KMO) and Bartlett's test of sphericity, in which the KMO result obtained was 0.930 and the Bartlett's significance value is 0. This initial result confirms the suitable of our data for factor analysis (the KMO must be 0.6 minimum and the Bartlett's significance value must be 0.5 or less). Three components with eiginevalues over 1.0 explained 59.9% of the variations in the data; however, using the scree plot and the component matrix, two components have the highest number of loading and explain 54.2%. Therefore, Principal Components Analysis with Direct Oblimin rotation with Kaiser Normalization was applied to extract the highest loading factors from the two components, which were identified as the major driver of morphological changes. Furthermore, descriptive and inferential statistics were used to assess the effect of existing policies in managing sprawl and land use change.

Forming process

The peri-urbanization process in Ikorodu in the past four decades reveals dynamism in urban change as well as a sprawling development pattern. The fractal analysis of the study area based on remote sensed imageries acquired from 1984 to 2015 shows a steady organic growth, in which sprawling precedes infilling. The values of fractal dimension increased steadily form the lowest 0.41 in 1975 to a low 1.44 value in 2015 (see table 2). A value below 1 indicates lack of connectivity of elements in the built-up space, while values slightly above 1 indicates sprawl (Thomas, Frankhauser, & Biernacki, 2008). The

Table2. Urban Growth and Fractal Dimensions of Ikorodu

Year	Population	Population Density per sqkm.	Urban Area (Ha)	Annual Urban Change Rate	Allocated Agric. Land Change to Urban (Ha)	Allocated Agric. Land (Ha).	% of Allocated Agric. Land Loss.	Agric. Land Change Dynamic Index	Fractal Dimension. (D)	a	Corr. Coeff.
1975	154377	389	419.00	0.00	0	17903	0.0	0.0	0.411	172.16	0.86
1984	170535	430	2252.05	229.13	274	17629	1.5	1.5	0.788	108	0.98
1990	182654	461	2961.83	118.30	707	17196	3.9	2.5	0.924	66.07	0.99
2000	390620	985	4587.01	162.52	871	17032	4.9	1.0	0.933	109.5	0.98
2006	527917	1331	7506.12	486.52	1425	16478	8.0	3.3	1.194	34.04	0.99
2011	946722	2388	9087.45	316.26	2293	15609	12.8	5.3	1.308	19.15	1.00
2015	1510594	3810	13772.10	1171.16	4615	13288	25.8	14.9	1.438	12.33	1.00

highest fractal dimension (D) value in this research is 1.44, which indicates sprawl. The implication of this pattern is the loss of valuable agricultural land to urban development, which has great repercussions on sustainable food production and security.

The continuous urban expansion in the past four decades as seen in the table 2 above have resulted in non less than 25.8% of the total land area allocated for agriculture and food production in Ikorodu. Moreover, the annual urban growth rate in the study area tripled from 316 Hectares per annum in 2011 to 1171 Hectares per annum in 2015, leaving much for concerns. The regression model applied indicates a strong positive correlation between fractal dimension 'D' and change dynamic index (CDI) for allocated agricultural land (r= 0.78 at 0.04 level of significance). This is because the more the infilling of sprawled spaces, the more the value of the fractal dimension (D) and the more loss of peri-urban agricultural land. Even though this pattern of growth is noticeable in most cities' growth throughout history, in which 'D' increases with time, the pertinent question is how guided is the growth or how conformed is the growth to existing regional plans?

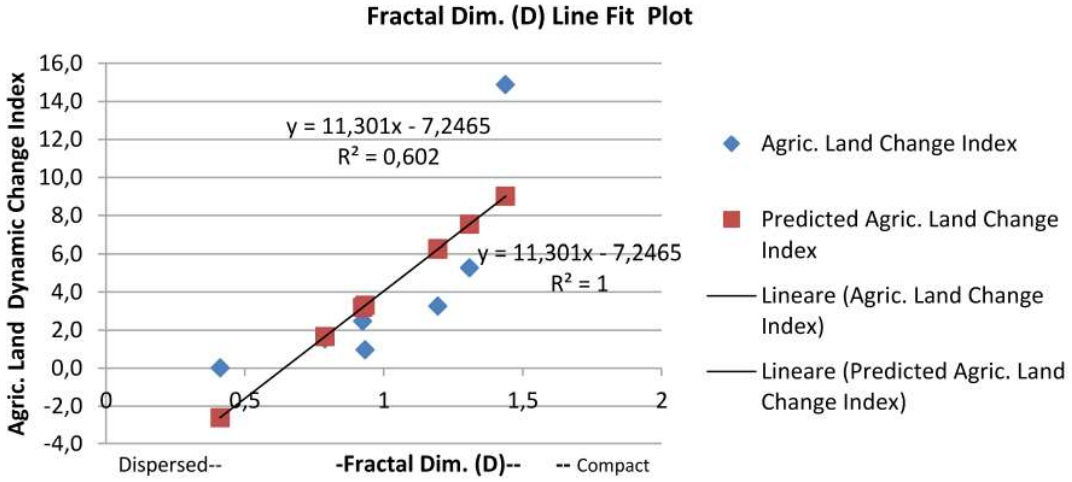
As seen in figure 4, there has been uncontrolled urban development on allocated agricultural land (about 25%), this implies that urban spatial expansion and densification has not followed the provision of the existing regional plan. Furthermore, the survey shows that only 39% of the respondents have obtained building permit, while any inspector of the development control or planning agencies had never visited the rest 61%. The ineffective development control system is partly responsible for uncontrolled expansion.

The factors responsible for continuous growth were reduced 18 to 10 using Principal Component Analysis as shown in table 3 below; however, three of the highest loading factors (i.e., those above 0.70) were selected as the main drivers of peri-urban growth in Ikorodu. These includes, less time and money spent on transportation from location (0.899), proximity to work (0.888) and good health and less stress than the city (0.829). Proximity to work and ease of transportation as principal driving factors is corroborated by the survey result shown in table 4 as 50% of the respondent indicated that the location of their workplace is within the Ikorodu municipality. As mention earlier, Ikorodu has the single largest industrial estate in Nigeria and is a home for many secondary and tertiary activities, these serves as attraction for housing and other development.

Conclusion

This research paper has been able to examine the growth and morphology of a peri-urban city spanning a period of forty years. The result of its fractal dimension analysis indicates rapid urban change, which also correlates with the speed agricultural land loss. Moreover, ineffective control and lack of policy implementation or enforcement

Figure 4. Map of Ikorodu Showing Urban Growth and Extents in Agricultural Zone (1984-2015)



has resulted in sprawling and unguided development in urban fringe areas of the Lagos metropolitan region exemplified by Ikorodu. The implication of this continuous n the absence of archaeological evidence, the confidence that can be placed in inferences is dependent on the uncontrolled expansion is diminution of precious agricultural lands and forested lands. Even though efforts have been made to quantify the peri-urban croplands globally (Thebo, Drechsel, & Lambin, 2014), this research, has also attempted to quantify the allocated agricultural land and shows that such lands in the study area has been reduced by a significant level of 25%, which if nothing is done, may affect food security of the Lagos metropolitan region. We therefore recommend that urban and regional planners in developing countries like Nigeria should incorporate the use of real time remote sensed data and geospatial technology in monitoring urban expansion, especially in the peri-urban areas, which presently seemed neglected. Furthermore, comparative morphological studies of other peri-urban towns in developing countries should be undertaken in order to develop theories endemic to situation in these climes.

References

Batty, M., & Longley, P. A. (1994). *Fractal Cities: A Geometry of Form and Function*. London: Academic Press.

Bell, K. P., & Irwin, E. G. (2002). Spatially Explicit Micro-Level Modelling of Land Use Change at the Rural–Urban Interface. *Agricultural Economics*, 27, 217–232.

Buxton, M., & Low, C. D. (2007). Change in Peri-urban Australia: Implications for Land Use Policies. *State of Australian Cities (SOAC) Conference*. Adelaide: Autralian Cities and Regions Network. Retrieved June 12, 2012, from http://soac.fbe.unsw.edu.au/2007/papers/include.asp

Fragkias, M., Langanke, T., Boone, C. G., Haase, D., Marcotullio, P. J., Munroe, D., . . . Simon, D. (2012). *Land Teleconnections in an Urbanizing World – A workshop Report*. Copenhagen: GLP-IPO/UGEC-IPO.

Frankhauser, P. (1994). *La Fractalité des Structures Urbaines.* Paris: Economica.

Harris, C. D., & Ullman, E. L. (1945). The Nature of Cities. *Annals of the American Academy of Political and Social Science*(242), 7-17.

Iaquinta, D. L., & Drescher, A. W. (2000). 'Defining periurban: understanding rural-urban linkages and their connection to institutional contexts. *Tenth World Congress of the International Rural Sociology Association.* Rio de Janeiro: International Rural Sociology Association.

Jiang, L., Deng, X., & Seto, K. (2013). The Impact of Urban Expansion on Agricultural Land

Use Intensity in China. *Land Use Policy*, 35, 33-39. Retrieved January 27, 2015, from http://dx.doi.org/10.1016/j.landusepol.2013.04.011
Lagarias, A. (2007). Fractal Analysis of the Urbanization at the Outskirts of the City: Models, Measurement and Expalnations. *Cyber Geo: European Journal of Geography*, document 391. doi:10.4000/cybergeo.8902
Lagos State Government. (2013). *Digest of Statistics 2013*. Lagos: Lagos Bureau of Statistics.
Lawanson, T., Yadua, O., & Salako, I. (2012). Environmental Challenges of Peri-Urban Settlements in the Lagos Megacity. In M. Schrenk, V. V. Popovich, P. Zeile, & P. Elisei (Ed.), *17th International Conference on Urban Planning, Regional Development and Information Society* (pp. 275-285). Schwechat: CORP Association.
Lifeng, S., Fang, L., Zengxiang, Z., & Xiaoli, Z. (2015). Monitoring Urban Expansion and Morphology Changes of Tangshan by Using Remote Sensing. In F. Bian, & Y. Xie, *Geo-Informatics in Resource Management and Sustainable Ecosystem, Communications in Computer and Information Science* (Vol. 482, pp. 625-634). Berlin Heidelberg: Springer.
Martellozo, F., Ramankutty, N., Hall, R. J., Price, D., Purdy, B., & Friedl, M. (2014). Urbanization and the Loss of Prime Farmland: A Case Study in the Calgary-Edmonton Corridor of Alberta. (W. Cramer, Ed.) *Regional Environmental Change*.
Tannier, C., & Pumain, D. (2005). Fractals in Urban Geography: A Theoretical Outline and an Empirical Example. *Cybergeo: European Journal of Geography*, document 307. doi:10.4000/cybergeo.3275
Terzi, F., & Kaya, H. S. (2011). Dynamic spatial analysis of urban sprawl through fractal geometry: the case of Istanbul. *Environment and Planning B: Planning and Design, 38*(1), 175 – 190.
Thebo, A. L., Drechsel, P., & Lambin, E. F. (2014). Global Assessment of Urban and Peri-urban Agriculture: Irrigated and Rainfed Croplands. *Environmental Research Letters*(9), 1-9. doi:10.1088/1748-9326/9/11/114002
Theobald, D. M. (2005). Landscape Patterns of Exurban Growth in the USA from 1980 to 2020. *Ecology and Society*, 10(1), 32-66. Retrieved from http://www.ecologyandsociety.org/vol10/iss1/art32/
Thomas, I., Frankhauser, P., & Biernacki, C. (2008). The morphology of built-up landscapes in Wallonia (Belgium): A classification using fractal indices. *Landscape and Urban Planning*, 84(2), 99-115.
Thomas, I., Frankhauser, P., & De Keersmaecker, M.-L. (2007). Fractal Dimension Versus Density of the Built-up Surfaces in the Periphery of Brussels. *Papers in Regional Science*, 86(2), 287-308. Retrieved from http://www-sre.wu.ac.at/ersa/ersaconfs/ersa04/PDF/69.p
United Nations, Department of Economic and Social Affiars, Population Division. (2014). *World Urbanisation Prospects: The 2014 Revision, CD-ROM Edition*. New York: United Nations.
Zhu, H.-y., & Li, X.-b. (2003). Discussion on the Index Method of Land Use Change. *Journal of Geogrphical Science*, 58(5), 634-650.

The growth and transformation of Salerno: From dissolution to the reassembly of the urban fabric

Simona Talenti, Annarita Teodosio
Dipartimento di Ingegneria Civile, Università di Salerno, Italy
Keywords: Salerno, flood, reconstruction, urban renewal, specific interventions

Abstract

Salerno, a city with a very complex morphology, presents a fragmentary urban organism that results from a gradual growth and the absence of a unified vision. The bipolarity between ancient town/new town, triggered by the first extensions of the Twenties −Plan by Donzelli-Cavaccini in the north-east and Plan by Colamonico on the littoral zone−, is definitively enshrined after the Second World War, by the expansion along the east coast, beyond the mouth of river Irno. Here the housing emergency caused by the flood of '54 −which devastated much of the historical center− and the population explosion of the economic boom years involved a disorganized growth, based on speculative reasons aimed to an intensive exploitation of soils and favored by the absence of an adequate city plan. On the threshold of the new millennium, the city looks like an heterogeneous and inconsistent organism: the stratified medieval system of the old town is opposed to the massive building of the new eastern districts, generally lacking in quality and services. The guidelines for a deep urban transformation are dictated by Oriol Bohigas in the new PUC (Piano Urbanistico Comunale) drawn up in the 90s. On the base of the criteria of a 'metastatic' urbanism, a season of punctual interventions in certain areas (Areas of Implementation Punctual Urban, namely strategic nodes around which to organize a total regeneration) began. The paper aims to apprehend the urban system of Salerno through the historical-critical analysis of the various stages of growth, until the most recent redevelopment projects (completed or underway) that, on a different scale, attempt the recomposition of an urban texture and the dissemination of quality and livability.

Introduction

Salerno, a city with an extremely complex morphology, has a fragmented urban structure, due to its gradual growth that completely lacked a unifying vision. The bipolarity of the ancient city/new city, triggered by the first expansions of the 1920s □ the Donzelli-Cavaccini Plan in the north-eastern section, and the Colamonico Plan along the coast □ was definitively formalized by the expansion along the eastern section of the coast after the second World War. The housing emergency in this area, brought about by the flood of 1954 and the demographic explosion of the boom years, led to unorganized growth which was further expounded by speculation and the absence of adequate planning tools. On the threshold of the new millennium, the city appears as an uneven and incoherent structure: the layered medieval design of the historic centre is contrasted with the imposing and shoddy construction of the new eastern neighbourhoods.

In the beginning of the 1990s, Oriol Bohigas, who was tapped to draft a new P.U.C. (Piano Urbanistico Comunale), municipal development plan, laid out the guidelines for a profound urban transformation. Based on 'metastatic' criterion of city planning, there began a period of precise interventions in given areas within the urban fabric., A.A.P.U. (Aree di Attuazione Puntuale Urbanistica), areas for specific urban intervention, in which strategic issues and hubs around which total renewal were organized.

This paper proposes a reading of the city planning system in Salerno through a critical-historical analysis of the successive phases of development, including the most recent re-qualification interventions (both completed and ongoing) which, on various levels, attempt to re-knit the urban fabric and spread quality of life in the city.

The flood of 1954. Construction of new neighbourhoods between emergency and planning (S. TALENTI)

The flood that devastated Salerno and the Amalfi coast in October of 1954 was an intense event with particularly devastating consequences for real estate and the urban space. Several districts in the western part of Salerno's historic centre suffered irreversible damage: some buildings fell, others were swept away by mudslides, and what remained were dangerous buildings that soon became unsanitary. "Houses, houses, houses!": this was the cry with which the locals greeted then head of state Einaudi on his visit to the affected area a few days after the catastrophe (De Ippolitis, 1954). Indeed, about 1700 families were without a home, but private and public institutions quickly offered help and various contributions. Thus Salerno was "reborn" quite quickly towards the East, with a series of precise interventions on public housing. The work was undertaken, however, with a fragmented urban design that was generally lacking a global vision and clear design criteria, designed solely to resolve the housing emergency quantitatively. Still, the intense expansion to the east also saw a few interventions that showed an original and mature idea on the forms and practices of living. The neighbourhoods "Pastena" (1958-60) and "De Gasperi" (1958-63), the designs for which were coordinated respectively by the Architects Bruno Zevi and Plinio Marconi, are truly urban proposals.

The first responses to the emergency

The majority of construction work for cheap popular housing took place in the south-east area of Salerno, in the Pastena neighbourhood, where the small town centre was surrounded by a vast agricultural area. In this flat area, the coastal road meets via Santa Margherita, a street that leads away from the sea and into the countryside. It is around this road that the first interventions began, led by the local government in collaboration with the U.N.R.R.A. Casas, l'INA Casa, and the Ministry of Public Works.

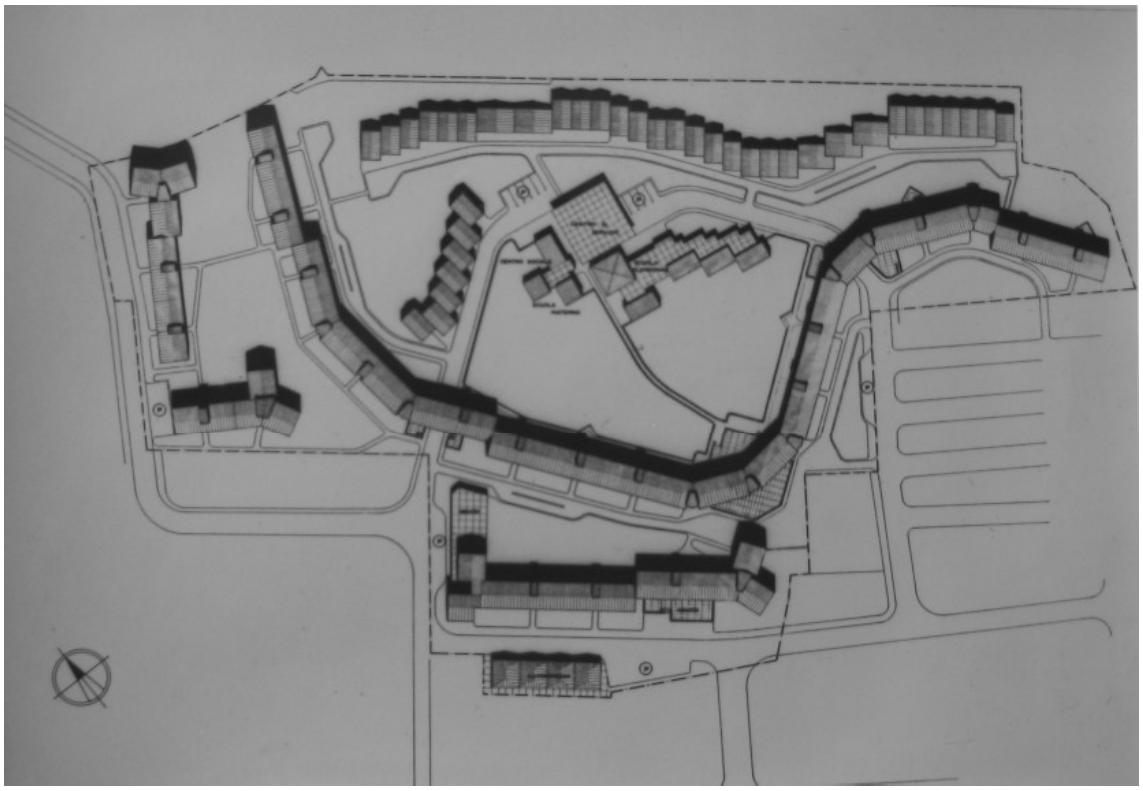
The extreme urgency to accommodate such a considerable number of homeless people stimulated solidarity even among various private entities which helped finance the creation of several residential units. Thus, for example, the Technical Office of Salerno projected various buildings that were financed by a magnate residing in Argentina, Filippo Gagliardi, or by fellow countrymen living in the USA, through the newspaper "Il Progresso Italo-Americano". With the exception of four buildings that the Engineer Sabatini

Figure 1. The flooded "Lauro" district; engineer Materazzo, 1955 (Archivio Storico del Comune di Salerno)

developed in January 1955 with money from Gagliardi, within a vast development plan to the south of the railroad – where, in addition to the residential buildings, the construction of a school, shops, and a recreation centre were also planned – the documents in the archive seem to confirm the hypothesis that the projection of the majority of these interventions took were realized in a state of emergency, and moreover each separate intervention was isolated, without any unifying action, without any lucid, coherent preliminary urban planning. Even in the buildings designed by Engineer Vittorio Materazzo, using the money collected by the newspaper "Roma" and its editor Achille Lauro, there was no well thought out urban plan, but rather a quantitative objective (50 apartments in five buildings of five floors each) .

There are still many grey areas to explore in order to recompose the total overview of this rebirth, and the search is rendered extremely difficult by the lack of documentation. But the undeniable fact remains that the new neighbourhoods were conceived of too often as sleeping areas, agglomerations of satellites, with buildings that have nothing to do with local traditions, far away from the city, with neither public services nor green spaces. Even the public interventions undertaken by the U.N.R.R.A. Casas, and in particular the neighbourhoods to the north of the railroad in the Santa Margherita di Pastena district, do not represent an area of privileged urban experimentation, but rather a precise response to the housing problem which took the form of simple and anonymous intense urbanization. Despite the seductive words about green spaces and the fortuitous orientation – used in the flyer "Ricostruzione edilizia nelle zone alluvionate del salernitano" published by the first U.N.R.R.A. Casas council –, in the village of "S. Margherita di Pastena" the number of apartments seems to be the most important aspect, with options of 4 or 5 story buildings, rather than the organization of green areas in the zone. The trees that do exist give the impression of simply bridging the gaps left by the systematic east-west orientation of the eight buildings , while the architectural design that was chosen – multi-story buildings – is motivated in a rather ambiguous way . The construction that took place in front of the railway – this too done by the U.N.R.R.A. Casas and already inhabited by about 60 families in 1955 – seems to be a rare gem among these post-flood interventions . This area sees smaller houses on lots formed of four living spaces, with relative lawns and gardens (Di Giorgio, 2011). But this subdivision, which takes into consideration the unity of the neighbourhood and the traditions of rural villages that were found to

Figure 2. Site plan for Zevi's project of the residential structure "Pastena", s.d. (Fondazione Bruno Zevi)



the east of Salerno's historic centre (like Pastena, in fact), will be nearly the only example of enlightened city planning.

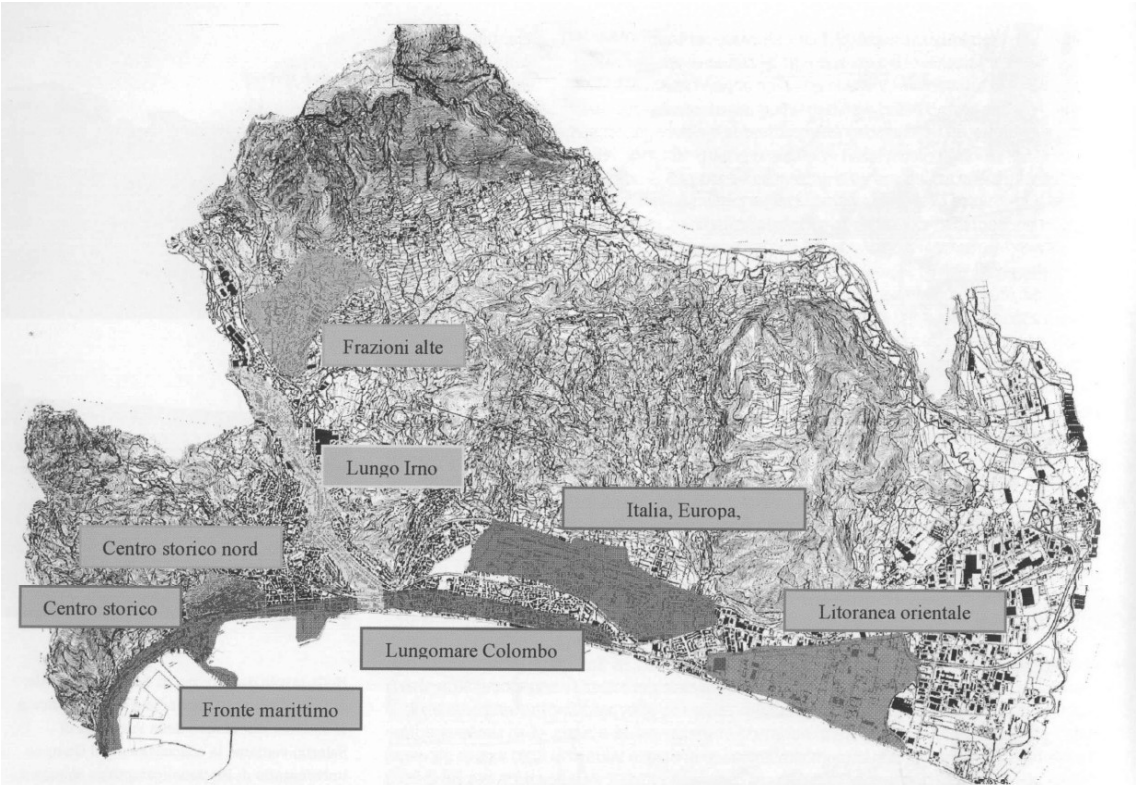
An attempt at a more informed city planning with a broader scale was undertaken by the architect Plinio Marconi. Hired in 1953 to form the new P.R.G. (Piano Regolatore Generale) for Salerno, Marconi also planned the future neighbourhood of Mariconda. This urban plan considered the visual landscape and foresaw numerous green areas, both public and private, while also took care to conceive of various public services: a market, recreation centre, a school and a church . The project's original design, elaborated in collaboration with Scalpelli, seems, however, to have been largely modified so as to form a densely inhabited area where the buildings all reach five floors (contrary to the extreme variety that the two architects had designed, which foresaw buildings anywhere from three to five floors and ample space for lawns and gardens). The market and school, which were constructed following the original project drawn up by Marconi and Engineer Gigliotti, seem completely out of place in the district, which today is in a clear state of decay.

"Enlightened" neighbourhoods

Within this scenario of new neighbourhoods, which sprung up without any true urban planning and which are characterized by incredible dense and rather anonymous building, one can distinguish two residential models of considerable size, that were attended to by architects of national fame. They are the two residential structures "Pastena" and "De Gasperi", both of which were constructed beginning in 1959, in the eastern expansion area of Salerno.

The first documents having to do with the Ina Casa neighbourhood, projected by the architects Zevi Balletti, Calandra, Di Carlo, Ronchi and with the Engineer Rubino, date back to April 1958. This neighbourhood has been nicknamed "the snake" and "the

Figure 3. Aerial view of Salerno with areas of interventions (A.A.P.U.) clearly marked



horse shoe" due to its winding layout which is characterized by a long, multi-floor building made of reinforced concrete lined with a brick facade and a long series of white-washed townhouses . These serpentine suburbs create a central area that is over-crowded, where public services and another small block of row houses are found. The neighbourhood, whose project called for 216 living quarters, was realized in various phases, between roughly 1959 and 1960, and was never completed according to Zevi's original design. Even though there are different kinds of buildings here (as Ina Casa's policies call for), the operation presents itself as a unified building, where free areas and tree filled zones dominate. Besides the citrus trees, the area is home to elms and oaks and all of the trees that were already present, and which the project tried very hard not to cut down. The original project also called for: small public gardens, a pair of smaller citrus orchards, and several small playgrounds interspersed evenly throughout the neighbourhood. The row houses are also designed with a paved area and a small front lawn, while the back years each had a private garden. The designers attentively studied the street grid and walking paths from the very start, as well as the main and side roads around the area. Two entrance streets come together in an underpass at the centre of the neighbourhood, where an area for two large citrus orchards is planned for.

Active in Salerno from 1953, Plinio Marconi was hired, also by Ina Casa, to elaborate a neighbourhood in the Pastena area, though further away than his Roman colleague . The project team was made up of many architects, among whom were Claudia Agostini, Massimo Battaglini, Giorgio Costadoni, Renzo Del Debbio, and Franco Tenca. The original plan for the residential structure situated in the "Conforti" area, which is now known as the "De Gasperi" neighbourhood, today is quite difficult to read and extremely compromised by the transformations that have taken place and by the fact that several buildings in the original plan were never built. The original project, which stands on a roughly 4.3 hectare plot of land, envisioned 206 apartments, various shops, a kindergar-

ten, and a community centre . The compositional logic shows, as was already seen in Zevi, a net desire to construct an almost auto-sufficient neighbourhood, where the green and common areas determine the general plan for the entire neighbourhood. Indeed, the buildings are designed so as to create a large open courtyard facing the south, filled with orange trees and demarcated by a line of buildings only on three sides. The empty space of this first courtyard is counterbalanced by another open space facing north and which has a very similar layout, though here there are row houses with private gardens. In the centre, a porticoed building with shops on the ground floor separates the two courtyards, while a single six-floor tower symbolically closes the neighbourhood to the south-east. The various types of buildings are united thanks both to this urban layout on the one hand, and simple, essential ideas on the other.

What Zevi and Marconi tried to promote with their residential structures – which separates their projects from the majority of the neighbourhoods created after the flood with the mere goal of rapidly resolving the housing emergency – was twofold. On one hand, the autonomy of these settlements: if they were realized with all of the services and social necessities that the planners had called for, it would have been possible to recreate the social and urban conditions of the districts in the historic centre. On the other hand they also hoped to promote a ling to the past and to local traditions, expressed through the different means like the choices in construction materials, the kinds of buildings, and the organization of external spaces.

Beyond fragmentation: Plans and projects for the contemporary city (A. TEODOSIO)

After the end of World War II Salerno grew very rapidly. The catastrophic events - the flood in 1954 and the earthquake in 1980 - along with the delocalization of important structures like the university, provoke a progressive emptying of the historic city centre. On the other hand, the demographic pressure linked to the economic boom of the 60s and 70s led to urban sprawl towards the east and the overbuilding of the hilly areas. The absence of an adequate city planning code favoured the birth of zones completely lacking in services and identities, while resulting also in the unjustified occupation of the territory; even the city's relationship with the natural landscape and sea was seriously compromised. At the end of the 20th century the city appears as an uneven and incoherent structure: the layered medieval design of the historic centre is contrasted with the imposing and shoddy construction of the new eastern neighbourhoods. Thus, since the 90s, there has been a sense of urgency for a total regeneration that points toward the recovery of degraded internal areas into the consolidated fabric of the city, along with improvement of the current fabric through the diffusion of urban quality and character.

Bohigas and the rules for the renovation

The search for rules for growth and reordering of the city's fabric is impossible without the creation of an adequate tool of territorial governing. Thus, in 1992, the local government entrusted the outlining of a new urban development plan to Oriol Bohigas (with MBM Arquitectes S.A.), already known in Italy for his intervention in the Olympics of Barcelona. This Catalan architect presented the so-called "Documento Programmatico" which was approved by the City Council in 1995. This programme was both theoretical and technical, and brought together guidelines and indications for the redesigning of the city, but it also laid out the results of specific studies and a series of plans that make up the starting point for the development of new urban projects. Bohigas believed that it was of fundamental importance to identify the limits between the "urban sprawl", where no new projects were to be developed, and the "urban centre" where requalification of the consolidated fabric, of public areas, and of the empty or derelict areas (industrial zone, port areas) were to be concentrated.

On the basis of this theoretical formulations and his recent Spanish experience, the architect proposed in Salerno the application of an innovative urban design, which he defined as 'metastatic', based on precise interventions in strategic areas, chosen specifically, which were called A.A.P.U. (Aree di Attuazione Puntuale Urbanistica), and which would eventually

Figure 4. "Fronte del mare"project design by Ricardo Bofill (A.A.P.U. 3, 3bis, 4 e 5)

become "elements that generate a transformational and renovating phenomenon in their surrounding areas" .

The work started with the delimitation of the areas for intervention - with a certain geographic, historical, typological, morphological, and social cohesion - and the identification of their principle characteristics, immediate needs, and future uses. This analysis phase was followed by the choice of homogenous zones - based on their dimensions, identities, and known problems - which would be prioritized and for which specific urbanization projects were elaborated: these were works that could be realized quickly and autonomously, despite the normally long time needed for the approval of the general planning tool.

Combining the technical choices and the indications formulated by the Administration, the first A.A.P.U. were decided: Southern Historic City Centre (1), Northern Historic City Centre (2), Santa Teresa and the Town Park (3 and 3bis), Trieste Seafront (4), Piazza della Concordia (5), Eastern Seafront (6), and Lungo Irno (7). These were later supplemented by three more: the High Zones (in the hills) and the Italia and Europa neighbourhoods. Thanks to this new way of 'making a city', since the second half of the 90s there has been a series of urban and architectural projects elaborated, and in some cases also constructed, which allow for important interventions to be begun and/or finished even before the definitive approval of the P.U.C., which only happened in 2006 after a long and difficult process.

City planning projects and starchitects for the New Salerno

Like Barcelona, Salerno is aiming for economic development and a re-launch of tourism, through the realization of a series of architectural and infrastructure interventions, along with an improved relationship with the sea. In light of these goals, there has recently been a series of design contests and interventions on various scales have been promoted, sometimes by world-famous architects, with the goal of constructing tourist attractions and new urban icons (Teodosio, 2014 a).

One of the zones which has received the most attention and tension is the communal waterfront (A.A.P.U. 3, 3bis, 4, and 5). On the western extremity, the area of Santa Teresa, which is occupied by port facilities and small abandoned factories (and which is a strategic point of contact between the historic city centre and the sea) desperately needs urgent re-generative intervention. In this area Bohigas had encouraged a project for the construction of a new neighbourhood with buildings of moderate height and footprint that were to be built around open internal courtyards to use as public spaces that would integrate a large public green space that we wanted to create near the sea. The general outline, with a linear development and facades toward the streets, is reminiscent of the historic seaside buildings and, at the same time, allows the use of space for commercial, produce, and service sector purposes on the ground floors, thus growing the collective use of the intervention. The project shows the attempt at a dialogue with pre-existent buildings, not understood

as a formal or stylistic but as substantial fact, and the architect's desire to 'stitch' the new buildings with the historic fabric. Unfortunately, despite successive modifications designed to finally obtain definitive approval, Bohigas' proposals are never applied practically. In 2007 the local government announced a contest for the design planning of the urban waterfront, called "Fronte del mare", with the aim of creating a new image for the city and giving it a new identity through an opening towards the sea. This contest was won by another Spaniard, Ricardo Bofill (with Lotti&Associati s.p.a.) whose proposal focuses on the creation of two large piazzas connected at the end of the old Trieste seafront. Towards the west it called for a large elliptical open space, Piazza della Libertà (with a diameter of 155 m and a total area of 26000 m2), surrounded by a monumental crescent with two underground floors for parking and seven floors above ground for businesses and residences. Bofill announced that he wanted to create works that were able to "bring together tradition and innovation […], and harmoniously communicate with the context, while exalting the values of the site" . In truth, the project, which is currently underway, seems grandiose and monumental in its dimensions and stylistic choices and, probably, will give the area around Santa Teresa an aspect that is much different than that which was foreseen by Bohigas, with his quiet and harmless proposals. In the same area, on the old Manfredi pier, the maritime station designed by Zaha Hadid appears, which is currently being completed. This structure has a sinuous form, similar to the hull of a ship or to an oyster, with an articulated design that aims to bring together creativity and functionality. Towards the east, at the opposite end of the seafront, lies Bofill's other proposal: Piazza della Concordia-Mazzini. This intervention calls for the creation of a complex system of public spaces on several levels (allowing for the circulation of traffic and subterranean parking, and large pedestrian areas on the piazza and pier) and the modernization of the nearby touristic port of Masuccio Salernitano. Here too the heart of the project is the construction of a large building, a glass tower that was also designed by Bofill but with a style and architectural language that is much different than that which he proposed in the Santa Teresa area.

The waterfront restoration projects extend beyond the mouth of the Irno River, and also include the strip of coast behind the newly constructed buildings, all the way to the bordering town of Pontecagnano. If the organization of the Colombo-Marconi seafront (A.A.P.U. 8) plays out in a series of systemic and precise actions which are contained in their dimensions and import (public spaces, green areas, piazzas, streets), the interventions on the eastern seafront, an area which is horribly degraded and devoid of services, seem much more profound and decisive (A.A.P.U., 11). For this zone, which is near Arechi stadium and the hospital, residential expansion is planned, but so is the creation of sporting and free-time services, like the Sport's Hall by Tobia Scarpa (not yet completed) and the Marina d'Arechi Touristic Port designed by Santiago Calatrava (currently being completed).

The urban restoration process does not exclude the ancient city centre. In the lower part (A.A.P.U. 1) there are various specific interventions taking place on public spaces and monumental constructions. The hill area (A.A.P.U. 2) as well, characterized by abandoned bulky convent structures, some of which have been restored and put back to use, has seen intervention. In 1997 this area was the object of an important architectural and urban planning competition, called "Edificio-mondo", which was won by the Japanese architects Sejima and Nishizawa for the public areas and the connection to the lower zone, while Monestiroli and de las Casas won for the restoration of some of the buildings.

Even the historically marginal area of the riverside Irno, made up of large free spaces devoid of character and identity, and littered with the residue of abandoned industrial activities, will see restoration projects both on an architectural and landscaping level (A.A.P.U. 6 and 7). The zone will be brought back to the city through an efficient system for the circulation and traffic, while some important timely interventions like the Judicial Citadel designed by Chipperfield and a large urban park in the ex industrial area by SALID have already been completed. A new residential and commercial area has also been designed by Fucksas, as well as a new mall on the area where the "Manufatturiere Cotoniere Meridionale" used to be, which includes some of the pre-existing buildings (both of which are nearing completion).

Conclusion

A reading of Salerno's structure and the analysis of some of the more important interventions which, in different eras and on different scales, attempt to compose or recompose the urban fabric, highlight the importance of a united and coherent project, both when working in zones of expansion and when working within the city centre that is already compact.

Indeed, the first attempts by Zevi and Marconi, with the construction of autonomous buildings, integrated into their context though they may have been, as well as the more recent requalification interventions (either completed or underway) on which the re-launching of the city's economy and its affirmation as a national and international destination for tourists (Teodosio, 2014 b), show the absolute necessity of a comprehensive design on a larger scale. That sort of great structural sweater that De Carlo defines as the "structure of the urban form": a general though flexible framework, a comprehensive fabric in which each single project, in an integrated and multi-disciplinary way, are inserted (Rossetti, 1996).

These projects are even more effective when they seem to be respectful of the history and essence of the territories, and when they search for solutions that, though they do transform the urban landscape, tend in any case towards a balanced and equitable composition, able to mix different realities as well as economic, social, and cultural differences (Bohigas 2004).

References

Batty, M., & Longley, P. A. (1994). *Fractal Cities: A Geometry of Form and Function*. London: Academic Press.

Bell, K. P., & Irwin, E. G. (2002). Spatially Explicit Micro-Level Modelling of Land Use Change at the Rural–Urban Interface. *Agricultural Economics*, 27, 217–232.

Buxton, M., & Low, C. D. (2007). Change in Peri-urban Australia: Implications for Land Use Policies. *State of Australian Cities (SOAC) Conference*. Adelaide: Autralian Cities and Regions Network. Retrieved June 12, 2012, from http://soac.fbe.unsw.edu.au/2007/papers/include.asp

Fragkias, M., Langanke, T., Boone, C. G., Haase, D., Marcotullio, P. J., Munroe, D., . . . Simon, D. (2012). *Land Teleconnections in an Urbanizing World – A workshop Report*. Copenhagen: GLP-IPO/UGEC-IPO.

Frankhauser, P. (1994). *La Fractalité des Structures Urbaines.* Paris: Economica.

Harris, C. D., & Ullman, E. L. (1945). The Nature of Cities. *Annals of the American Academy of Political and Social Science*(242), 7-17.

Iaquinta, D. L., & Drescher, A. W. (2000). 'Defining periurban: understanding rural-urban linkages and their connection to institutional contexts. *Tenth World Congress of the International Rural Sociology Association.* Rio de Janeiro: International Rural Sociology Association.

Jiang, L., Deng, X., & Seto, K. (2013). The Impact of Urban Expansion on Agricultural Land Use Intensity in China. *Land Use Policy*, 35, 33-39. Retrieved January 27, 2015, from http://dx.doi.org/10.1016/j.landusepol.2013.04.011

Lagarias, A. (2007). Fractal Analysis of the Urbanization at the Outskirts of the City: Models, Measurement and Expalnations. *Cyber Geo: European Journal of Geography*, document 391. doi:10.4000/cybergeo.8902

Lagos State Government. (2013). *Digest of Statistics 2013*. Lagos: Lagos Bureau of Statistics.

Lawanson, T., Yadua, O., & Salako, I. (2012). Environmental Challenges of Peri-Urban Settlements in the Lagos Megacity. In M. Schrenk, V. V. Popovich, P. Zeile, & P. Elisei (Ed.), *17th International Conference on Urban Planning, Regional Development and Information Society* (pp. 275-285). Schwechat: CORP Association.

Lifeng, S., Fang, L., Zengxiang, Z., & Xiaoli, Z. (2015). Monitoring Urban Expansion and Morphology Changes of Tangshan by Using Remote Sensing. In F. Bian, & Y. Xie, *GeoInformatics in Resource Management and Sustainable Ecosystem, Communications in*

Computer and Information Science (Vol. 482, pp. 625-634). Berlin Heidelberg: Springer.
Martellozo, F., Ramankutty, N., Hall, R. J., Price, D., Purdy, B., & Friedl, M. (2014). Urbanization and the Loss of Prime Farmland: A Case Study in the Calgary-Edmonton Corridor of Alberta. (W. Cramer, Ed.) *Regional Environmental Change*.
Tannier, C., & Pumain, D. (2005). Fractals in Urban Geography: A Theoretical Outline and an Empirical Example. *Cybergeo: European Journal of Geography*, document 307. doi:10.4000/cybergeo.3275
Terzi, F., & Kaya, H. S. (2011). Dynamic spatial analysis of urban sprawl through fractal geometry: the case of Istanbul. *Environment and Planning B: Planning and Design, 38*(1), 175 – 190.
Thebo, A. L., Drechsel, P., & Lambin, E. F. (2014). Global Assessment of Urban and Peri-urban Agriculture: Irrigated and Rainfed Croplands. *Environmental Research Letters*(9), 1-9. doi:10.1088/1748-9326/9/11/114002
Theobald, D. M. (2005). Landscape Patterns of Exurban Growth in the USA from 1980 to 2020. *Ecology and Society*, 10(1), 32-66. Retrieved from http://www.ecologyandsociety.org/vol10/iss1/art32/
Thomas, I., Frankhauser, P., & Biernacki, C. (2008). The morphology of built-up landscapes in Wallonia (Belgium): A classification using fractal indices. *Landscape and Urban Planning*, 84(2), 99-115.
Thomas, I., Frankhauser, P., & De Keersmaecker, M.-L. (2007). Fractal Dimension Versus Density of the Built-up Surfaces in the Periphery of Brussels. *Papers in Regional Science*, 86(2), 287-308. Retrieved from http://www-sre.wu.ac.at/ersa/ersaconfs/ersa04/PDF/69.p
United Nations, Department of Economic and Social Affiars, Population Division. (2014). *World Urbanisation Prospects: The 2014 Revision, CD-ROM Edition*. New York: United Nations.
Zhu, H.-y., & Li, X.-b. (2003). Discussion on the Index Method of Land Use Change. *Journal of Geogrphical Science*, 58(5), 634-650.

Reading and redesigning of district Tafoura in centre of Algiers

Farah Hadji, Meriem Leina Hadji, Quenza Bougherira

Keywords: Urban morphology, urban structure, urban growth, City/sea relationship

Abstract

The city of Algiers has known a rather rapid development. Many of the city parts, especially overlooking the sea, have not been completed or structured to ensure the relationship between city and sea.

So, a consolidation of the urban structure was necessary to reset the true potential of the city.

That's why our general problem is:

How to ensure the relation sea city by ensuring the continuity of the process of formation and transformation of the city?

Typomorphology allows the reading comprehension processes of formation and transformation of human settlements.

It is a method that encompasses different scales of human settlements, and therefore can design a built-in hierarchy of structures that surround and contain the project.

Muratori draws three main lessons (or laws):

1. The type of structure is not characterized beyond its practical application, that is to say outside the built fabric.

2. The urban fabric, also, is not characterized outside its framework, that is to say out side the study of the entire urban structure.

3. The study of urban structure is conceived only in its historical dimension because its reality is based in time by a series of reactions and growth from a previous state.

In this framework, we propose a solution for an urban project to solve the problem of continuity of the urban structure of the city of Algiers.

Introduction

The city of Algiers has known a rather unusual development compared to other world cities. Its development was stopped or interrupted by the arrival of settlers who upset the spontaneous and natural growth of the city by creating a different typology. However, they tried to follow the morphology of the land and ensure the growth of the city according to its important and structuring percourses. But as their objectives were essentially military and commercial (economic), the city / sea relationship has not been studied from a purely civil point of view, except for the period before the extension of the city outside the walls and the birth of railroad.

The cut between city & sea which followed has been physically expressed by the installation means, for economic production (rail transport, warehouses, factories ... etc.) and military installations. After independence many of the city parts, especially the parts overlooking the sea, as the boulevard Khemisti, have not been completed or structured to ensure this relationship.

How to ensure the relation sea city by ensuring the continuity of the process of formation and transformation of the city according to its proper culture and following the geographical position of the city? It is thus a cultural issue that the city is facing.

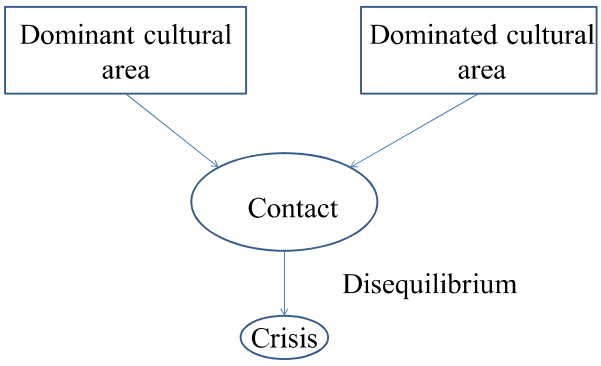
A stable culture, to exist, must be in its own area. This is called a cultural area.

In this cultural area of life issues arise. They are existential, spiritual. The society living in this cultural area ends up giving answers to individual and collective problems. Every nation responds to its problems in its own way.

The problem is the same everywhere, but it is the answer that changes. It is how the response is itself built on the culture that is the specificity of a society.

The crisis is part of human nature that it is the tool through which a society seeks balance and stability. It is the action by which we try to restore balance.

The crisis is disequilibrium. But it is not the end; it is the beginning of the answer to problems. So the crisis is positive. The disequilibrium is a situation where you put different solutions to the same problem, when we must choose between two solutions one which is familiar to us, which is ours, and one that comes from elsewhere, a culture that invaded another culture. In Algeria, there were in the years of the French occupation contact between two different cultures, one dominant and the other dominated. The latter tended to underestimate their own culture.



Spontaneous Search for a new equilibrium

How to ensure the relation sea / city by ensuring the continuity of the process of formation and transformation of the city and following the geographical position of the city?

Prior to 1962, under the rule of the dominant culture, the choice was impossible. But after independence, freedom of choice puts us in crisis.

How can this choice then be?

In our society, we are in a situation where there is this dislocation between the content and form of everything we do.

The only choices we make on the form put us in a crisis situation.

We do not know how to respond more. For this we must return to the spontaneity and the type is a response to problems in a society in crisis.

Typomorphology allows the reading comprehension processes of formation and transformation of human settlements, in order to act on them.

It also brings out the forms of urban fabric, features forms of urban or territorial organism, and identifies elements and components of their organization. Similarly it allows to define the mechanisms and laws that manage their relationships through a synchronic and diachronic return of their evolutionary process.

It is a method that encompasses different scales of human settlements, and therefore can design a built-in hierarchy of structures that surround and contain the project.

Methodology

The typomorphology is more than a classification instrument, it is a reading and projettation tool, and it is an attitude that allows to reveal the organised aspect of human activity.

The MURATORIAN method looks at the city as a whole to be observed in these different scales: the territory, the city (the urban organism), the aggregate (the fabric or the neighborhood) and the building. Under this approach, MURATORI exposes two levels of interpretation: the first is the observation of the frame, not as an isolated object, but in its relation to unbuilt areas (the plot, the street), the second level of reading is to observe and study the grouping of parcels that leads us to consider the characteristic structure of the fabric elements according to their location in the body of the city, according to the period of their making and to their growth. From this, he draws three main lessons (or laws):

1. The type of structure is not characterized beyond its practical application, that is to say outside the built fabric.
2. The urban fabric, also, is not characterized outside its framework, that is to say outside the study of the entire urban structure.
3. The study of urban structure is conceived only in its historical dimension because its reality is based in time by a series of reactions and growth from a previous state.

The MuratorienneSchool was once revolutionary, and what Muratori said as organized in a general framework, others could only express it as parts of the reality.

A disturbing and undeniable fact arises with the observation of the phenomenon "city" from a morphological point of view ; it is the awareness of the constancy of parameters that form a set of verifiable laws in the evolution of the city, independently of the considered city.

The morphological dimension of cities seems to possess some structural constancy in terms of its growth projection on the ground.

It is the recognition of this constancy which gives rise to the new discipline called urban morphology.

This discipline is a branch of typomorphology which includes both the architectural and the urban phenomena.

The thought of typological process could be expressed as follows: the apprehension of material things in a continuum of formation and transformation, from a mature state to another through automatic adaptation to the new conditions that surround them, and are constantly evolving, constantly changing.

Caniggia , disciple of Muratori , expresses this by the concept of symbiosis between the existing fabric and contributions that are made continuously in time; not as juxtaposed and added , but as new elements entering the system and modifying it, adapting simultaneously new data, thus forming a coherent whole.

With urban morphology, finally a manageable aspect scientifically based on the recognition of mechanisms of urban development models, through scientific observation and scientific approach method, allows us to minimize misguidance in some urban ap-

proaches based on individual inclinations regarding the " being" of the city. This simply means that discipline is now reaching its mature phase, and thus producing specialized branches within itself.

The '50s saw a huge change in the morphological structure of cities.

The degree of change has become such that their management through urban planning and urban policies became necessary. Progressive transformations of cities, through a manageable level by successive stages du to technological developments and changing needs of the people, were now replaced by a radical change in the way to grow a city. So, the concept of metropolis had to be introduced to name the gigantic urban phenomenon we are witnessing in a continuous development.

This metamorphosis or transformation of urban behavior first starts with a loss of "urban now how", which appears first in the suburbs.

The suburban model is based on a loss of the intrinsic qualities of the traditional urban fabric. Indeed, if we consider the successive outskirts of cities, we find that there is some constancy, a balance in the urban fabric. Morphological basic structure is maintained throughout history, and during any civilization whatsoever. Morphological structure continues to exist in its "organic" expression to use Muratori's terms.

Still in his quest for knowing the "real" urban and architectural phenomenon, Muratori has launched a revolutionary form of architectural education, based on surveys done on the old fabric of the city, and a synchronic and diachronic classification of architectural types encountered.

Muratori came to define the city as a work of art , created by a community, through the centuries;

The characteristics of ancient cities are unique in that they retain in their folds history and civilization strata.

Codified in this environment, the act of building becomes a gesture of spontaneous consciousness . The experimentation and accumulation of knowledge to face problems and new needs, or renewed with each generation ages, provide access to cultural capital, became part of the collective memory, which will induce spontaneous continuity in the act of building, as a result of a synthetic a priori knowledge developed by past generations.

We arrive with the muratorienne vision of the relationship building / time, to the consideration of the time taken by the "object" (the urban phenomenon) to evolve, and not the actual time of the observation.

The model of urban evolution developed by Caniggia is essentially based on transformations, that is to say the process of successive states of the urban phenomenon in time.

The Cubist movement interpreted the last century, the relationship of the building to the time in the time it takes for the person, the observer to discover the object: it is the position generally accepted by all theories in a world where man has become the center of all things.

For Caniggia , it is less time focused on the person who discovers the object, but rather on the object itself , the object "in itself" , the time it takes to "be" and then 'to become' , time which puts its successive parts on the object, generating elements of symbiosis.

Time relative to the object; this is the new interpretation of the model from time stance, formulated by Caniggia.

Forming process: reading the city

The growth of the city of Algiers has been materialized through duplication operations.

Beginning with its first location in the territory from the main ridge coming down promontory where it branches into two secondary ridges.

Then the city was structured in time and space , taking the territorial sub- unit which is bounded by two rivers (wadi Kniss , and Meckel wadi) , as territorial starting module .

So was born the Casbah, then there were duplications south-east, and what was peripheral districts became center (Boulevard de Port Said, then Khemisti)

Cuts between duplication came from previously existing rivers and their connection will be through the creation of boulevards every time there is a river.

The fabric of the city is different in each duplication. This difference in tissue is due to

its location in the city. That is to say, its location next to a major route or near a nodality or antinodality or in hilly or flat site, will influence the type of tissue in the city.

Thus we observe in the Casbah organic and densified tissue, and at Isly, a regular and serial fabric in the flat part developing on the structuring route of the city. Each Boulevard will undergo aggregation mode depending on its position relative to the nodal and anti-nodal parts that constitute it.

On the boulevard Khemisti, the aggregation will follow this logic of nodality and antinodality. The lower part of the boulevard Khemisti node is due to structural path and to the harbor, where the aggregation will have the characteristics of a pole, and then gradually continue to the upper part and becomes an antinodality.

Finally, each of these scales will have a typology that will undergo transformations in time and space, and each of these scales is inseparable from each other, forming a whole, a system, an organism.

Therefore, our project has been based on these readings, and after including the typological process in each scale, we attempt to ensure the continuity of this process, identifying issues that will lead us to the correct answer, by the realization of a project for urban and architectural scale (territory, city, area, buildings)

In our case the boulevard Khemisti represents the junction between two districts or entities.

It has a special character at each of the four scales, starting with the territory where it is located on a cliff, that is to say it is a break, a barrier between two territorial subunits, then at the city scale, where it is the border of two districts, where it will represent the junction between these two districts. At their meeting, a centrality is born.

At the aggregate scale, the formation of the boulevard is made regarding to the node and the anti- node, that is to say, from the fort Bab Azzoune to the Government Palace. At the building scale, typology has been realised in the continuity of the district or the previous entity, that is to say Isly.

Following the succession of scales that we observed, we will intervene mainly by the urban project, at the scale of the city and the aggregate at the same time.

According to the reading done, a problem emerges for Khemisti Boulevard.

Nodal part of the boulevard is situated at the intersection of Constantine road, Tafoura district, and the harbor.

The nodal position of its port, which is an integral part of the boulevard and an important element of the node, and its orientation towards the sea from which it is cut , make this part of the boulevard an urban space with peripheral structure characteristics which requires to be redesigned as a polarity.

So our hypothesis is as follows:

How to ensure the continuity of the boulevard to the sea?

Principles of the turban project

As the boulevard Khemisti is incomplete at its relationship with the sea, that is to say, the harbour section, it will need an "embroidery" action, because at some point this relationship is broken by a heavy traffic, the ramp, and the high-way.

So our working hypothesis is based on two main ideas:

- separate pedestrian & vehicles traffic and avoid that they have the same level, that is to say, avoided the conflict.
- The second idea is to ensure the physical continuity between the boulevard and the sea. To do this, our reference tool will be the type. After reading the different levels of anthropic establishment. It was possible to identify the type of Algiers and the con structive base module of this type:

• The typology of the building in line (casa in linea) with arcades (XIX s). The type of court yard house.

• The elementary cell module on which we will rely to design the project.

Taking into account the conservation of historic buildings on the site as the bastion 14 (Fort Bab Azzoune), and the existing routes structures as a matrix for our proposed solu-

tion. We thus proceeded to carry out the evolution of the fabric of our site from a critical state to a more consolidated state.

The first step of the project:

A. Continue the percourse towards the harbor, taking into consideration their hierarchy.

B. Place the base module perpendicularly along these pathways to develop at the end semblance islets.

This step allows us to draw the basic structure of the project on the scale of Algiers 19th century in continuation with the existing fabric.

The second step:

A. Adjust to the existing constraints, the different structural requirements of the project.

The third step:

A. It is the realization of the first project idea: that is to say, vertically separate mechanical and pedestrian traffic.

B. Raise the whole and attach Boulevard Khemisti at the plot of the main postoffice with the port by a pedestrian plaza that represents the structuring percourse of the project.

Conclusion

Port cities have a particular potential. They can use the sea for multiple purposes: economy, trade, tourism...

Once imprisoned behind their defensive walls, they open today to this great wealth.

The city of Algiers also must find the connection with the sea.

As its centrality moves progressively towards successive outskirts, these new nodal areas should be redesigned and structured to receive these new functions of centrality.

A number of projects are underway, such as the great mosque of Algiers.

The Tafoura area also presents an important node to be taking into consideration among the major projects to give Algiers its new image.

Our project has an essential mission, "sewing" the somehow unfinished part of the fabric of Khemisti Boulevard to the sea. Restructuring work we have done, gives this place the status of supermodule in the theoretical model of Caniggia: indeed, the complexity of relationships, and organizing solutions provided by the project , give this area a higher urban value.

In addition to this, the creation in this place of a cultural complex reinforces the image of the city.

References

Caniggia G. and Maffei G.L., (1979) *Composition Architecturale et Typologie de Bâti*, traduit de l'Italien par Pierre LAROCHELLE, (Ville Recherche Diffusion)

Deluz J.J., (1988) *Urbanisme et architecture d'Alger, Aperçu Critique*, (Pierre Mardaga éditeur et OPU)

Caniggia G., (1994) *Une Approche Morphologique de la Ville et du Territoire : Lecture de Florence*, (Institut Supérieur d'Architecture Saint-Luc Bruxelles)

Cresti F., (1993) *Contribution à l'histoire d'Alger*, (EDITION CENTRO ANALISI SOCIALE PROGETTI)

Missoum S., (2003) *Alger à l'époque ottomane, la médina et la maison traditionnelle*, (INAS Edition), Levés du Capitaine Morin effectués dés 1830.

Petruccioli A., (1998) *Rethinking XIXth century city*, (Aga Khan Publication)

Petruccioli A., (2007) *After amnesia: Learning from the Islamic Mediterranean Urban Fabric*, (edition ICAR)

Urban Morphometrics: Towards a Science of Urban Evolution

Jacob Dibble*, Alexios Prelorendjos*, Ombretta Romice*, Mattia Zanella, Emanuele Strano, Mark Pagel, Sergio Porta*
*Urban Design Studies Unit, Department of Architecture, University of Strathclyde, UK
Department of Mathematics and Computer Science, University of Ferrara
Geographic Information Systems Laboratory, Ecole Polytechnique Fédérale de Lausanne, CH
School of Biological Sciences, University of Reading, UK
Keywords: Urban Morphometrics, Evolution, Principal Component Analysis, Cost Benefit Analysis

Abstract

Urban theorists, social reformists and philosophers have considered the city as a living organism since Plato. However, despite extraordinary advancements in evolutionary biology, now being used to explain social and cultural phenomena, a proper science of evolution in cities has never been established since Geddes' work at the dawn of the Town Planning discipline.

Commencing in the tradition of Urban Morphology, this research develops and validates a statistically reliable and universally applicable urban taxonomy. The research solidifies existing definitions of built form at the scale of the urban fabric and identifies the constituent elements of form in 40 contemporary UK cities. Quantifiable measurements of these elements allow mathematical descriptions of their organization and mutual relationships. Further, an optimized list of indices with maximum discriminatory potential distinguishes between cases from four historically characterised categories: 1) Historical, 2) Industrial, 3) Modernist, 4) Sprawl.

This seminal work demonstrates that: a) it is conceptually sound and viable to measure urban fabric utilizing public, big-data repositories, b) the proposed morphometric system accurately characterises the structure of urban form and clusters cases properly based on their historical origins, c) scientific models of biological evolution can be applied to urban analysis to understand underlying structural similarities.

Urban Morphometrics approaches the diversity of city form as early biologists approached the diversity of life forms on the planet. These morphometrics enable classification of existing and ancient urban form and can influence the direction of future urban developments.

Introduction

Cities as organisms: beyond the analogical approach

In a speech delivered before an audience of sustainability scholars in 2004, Christopher Alexander addressed an *evolutionary* interpretation of the process of construction, interpreted as the "unfolding" structure of change that is typical of living organisms and nature in general (Alexander, 2004); for Alexander the homology between biology and construction must be firmly established at the level of the structure of the generative process, that of *morphogenesis*, rather than of the final product's aesthetics. This implicit focus on time is essential of everything that is built, but has always been hostile to urbanists. Among them, urban morphologists are certainly have peculiarly placed change – and therefore time – at the heart of their work since the beginning of the modern discipline (Muratori, 1960, Conzen, 1960); in so doing, they focused on the urban "fabric" rather than the city as a whole, a scale that equally informs the choice of the Operational Taxonomic Unit in our study. However, after more than a half century since those pioneers' time, a literature review reveals that it still lacks a quantitative and comprehensive analytical method. In fact, notwithstanding the remarkable amount of effort spent by the founders themselves, their direct descendants (Cataldi et al., 2002, Whitehand, 2001) and international Urban Morphologists across Spain, France, USA, Australia and China (Ibarz, 1998, Darin, 1998, Conzen, 2001, Siksna, 2006, Gu and Zhang, 2014), we still do not possess a systematic method of assessing urban form on a rigorous basis. An extensive review of the entirety of the Journal of Urban Morphology and more reveals that only 23% of all articles adopt are systematic, only 21% are quantitative, and less than 20% are both (Fig.1).

Our aim in this paper is to identify and test a systematic framework for the investigation of urban form's evolution. We seek explicit *analogies* to the evolution of life, moving beyond the *metaphorical* approaches to cities as mechanisms or organisms (Steadman, 2008, Marshall, 2008). We view cities as cultural products in evolution (Dawkins, 2006, c.1976,

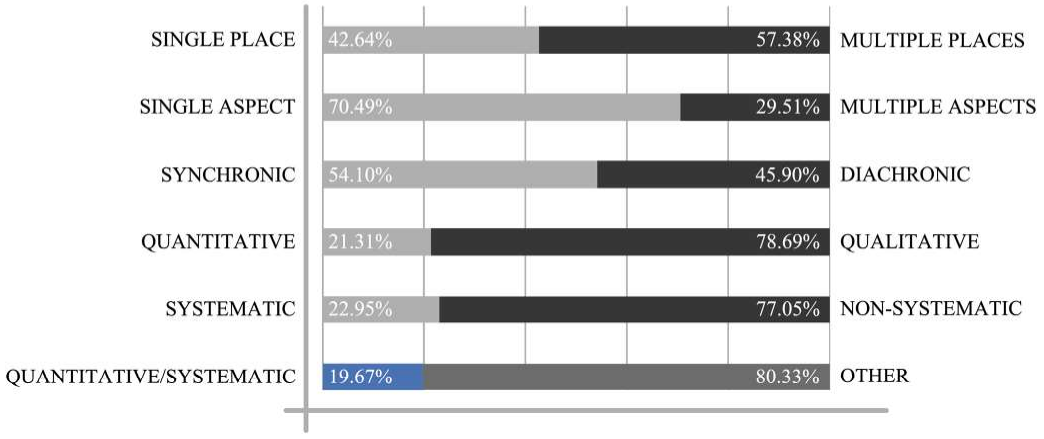


Figure 1. Trends in urban morphology case study research.
Current case studies research from the last 18 years of the Journal of Urban Morphology as well as other scientific works in the field have been scrutinized according to 5 dichotomies: a) single or multiple places, in that one or multiple locations are considered for analysis; b) single or multiple aspect, in that one or multiple objects of study are utilized for conclusions; c) synchronic or diachronic, if they focus on a single time period or multiple time periods; d) quantitative or qualitative, if the conclusions are based on numerical data or descriptive data; e) systematic or non-systematic, on whether their overall approach reflects a consistent and replicable method. The *systematic* and *quantitative* qualities of the research are most relevant in establishing a science of urban morphometrics. However, of all the scientific works overviewed in the field, less than 20% can claim to exhibit, at any level, both such qualities at the same time

Richerson and Boyd, 2008, Pagel, 2012b), whose form represents the outcome of tens of thousands of years of cultural selection. To the extent that these needs are universal to our species, we expect similarities in form and function across space and time. On the other hand, a hallmark of human evolution is cumulative cultural adaptation (Pagel, 2012a) characterized by the successive accumulation of technologies and social complexity. However, without further exploring the epistemological and terminological basis of urban evolution, we engage first and primarily in a foundational study of *urban morphometrics*.

Morphometrics in biology is "*the quantitative characterization, analysis, and comparison of biological form*" (Roth and Mercer, 2000), which sits at the intersection of developmental and evolutionary biology, i.e. the study of the evolution of developmental mechanisms that drive the growth of living organisms; as such, it is "*a means of extracting information about biological material and biological processes*" (ibidem, p.801). The study of form is conducive to the relationships between organisms, and to the processes that generate them. The contribution of morphometrics is "*precision in the ability (a) to recognize forms that are intermediate, (b) to judge degrees of proximity or similarity to other forms, and (c) to extrapolate or predict hypothetical, experimental, or nonexistent extremes*" (ibidem, p.802). Its modus operandi is therefore "to quantify the size and shape of organisms with the methods of multivariate statistics" (Klingenberg, 2002), in order to shed light on the evolution of forms and in particular on transformations that bring from one form to another (D'Arcy Thompson, 1942, c.1917), where we presume these transformations tell us something about development (ontogeny).

A major shift, or indeed a "revolution" (Rohlf and Marcus, 1993) in the discipline intervened in the 1980s after the introduction of a new coherent set of methods operating in particular at the level of form recognition and quantification: "traditional" methods, based on the *algebraic* measurement of distances characterizing the size of organs or entire organisms, are now complemented by *geometric* methods that are based on *graphic* processes of recognition and manipulation of their *shape* through the extrapolation of relevant nodes, or *landmarks* (Reyment, 2010, Adams et al., 2013). This new approach can be considered a synthesis between the two primary traditions of morphometrics: *multivariate biometrics*, emphasizing a focus on the statistical analysis of form rather than geometry, and *geometric visualization,* which focuses on the visible geometric shapes of organisms rather than the numerical quantification of these shapes (Bookstein, 1993). Our approach to urban morphometrics is one of *traditional morphometrics:* in fact we characterize the form of the urban fabric utilizing a vector of measures that quantify individual aspects of its constituent elements, and their relationships in space.

Urban Morphometrics: a systematic understanding of urban form

Historically, morphometrics has been crucial in the emergence of evolutionary biology by introducing a rigorous quantification of the phenotypic traits of living organisms and their *similarity*. Measurements of morphological traits—among others—were instrumental to developing the science of classification that we know under the somehow interchangeable terms of *Taxonomy or Systematics* (Manktelow, 2010). "*Classification is the basic method which man employs to come to grips with and organise the external world. Plants and animals are in fact classified in basically the same way as non-living objects; on the basis of possession of various characters or relations which they have in common*" (Heywood, 1976). The necessity to classify and organise the external world is fundamental in several disciplines of biological and evolutionary sciences, all of which fall under the umbrella category of Systematics. Systematics is the "*scientific study of the kinds and diversity of organisms and of any and all relationships among them*" (Simpson, 1961). The result of a Systematics analysis is a *system of classification* that best expresses the various degrees of similarity between organisms; such systems can be used for the storage, retrieval and communication of information, for facilitating predictions and ultimately for forming generalisations of unknown organisms and inferring relationships between the units that are classified, or *taxa* (Jeffrey and Heywood, 1977).

The concepts and methodologies developed extensively in Systematics are relevant to the rigorous analysis of urban form. In their work on numerical taxonomy, Sneath and

Sokal (1973) proceed by first identifying the *Operational Taxonomic Unit* (OTU). The identification of the OTU is a crucial decision that entails the consideration of multiple factors, such as the *purpose* of the classification, the structural organization of what is to be classified, its most appropriate *rank* and stage of development, or other non-necessarily morphological factors. The OTU is instrumental in determining what are the features that we should look at in order to assess similarities and differences between taxa. These *taxonomic characters* are "*a characteristic (or feature) of one kind of organism that will distinguish it from another kind*" (ibidem, p.71); in a morphological perspective, it is the character's variable phenotypic expression, or character *state*, that we assess either qualitatively or quantitatively in our attempt to establish similarities and differences between OTUs. As classification is based on comparison, when comparing two different OTUs in search of their level of similarity, what we really do is comparing their characters' states. It is therefore a pre-requisite of any classification in Systematics that we do that "*over a set of characteristics applicable to both of them*" (ibidem, p.75), or, more precisely, over *homologous characters*. For example, we may want to establish what are the species represented in a collection of plants (objective of the classification). For that purpose we classify individual plants rather than, for example, groups or populations of plants; in this case, a choice regarding the scale of our observation (that of the organism) leads to the identification of the OTU (the individual plant). A preliminary observation may reveal that some plants have serrated leaf edges while others have regular ones. Being serrated or regular are discriminatory *states* of that particular character of the plant, the *leaf edge*, which is regarded to be *homologous* in the case in question.

In biological systematics, classification at almost all levels is based on individual *organisms*, an entity that is in most cases unambiguous. That is not the case in urban studies. What is "the organism" in cities? Is it the city itself, or the district, the neighbourhood, or the street? Our urban morphometric analysis aims at: a) identifying the unit of analysis (OTU), b) rigorously defining the constituent elements of the urban form which, at the scale of the unit of analysis, are universally correspondent (homologous characters); c) determining the visible qualities that these elements can take in the real world (character state); d) adopting a system to quantitatively measure these visible qualities which is universally applicable and replicable; this must include the identification of the smallest set of variables able to deliver an *appropriate* description of cases, and a reliable validation theory against which such appropriateness is tested.

Finally, though the rigorous description and classification of organisms practiced in biological systematics must be regarded as fundamentally distinct from inferences of their ancestral relationships or common descent, which is specific to Phylogeny (Borgmeier, 1957), our effort to establish an Urban Morphometrics discipline opens the way for further explorations of what we may evocatively call "the urban tree". According to Sneath and Sokal (1973) in fact, "*it is almost a truism that an intimate relation must exist between phenetic evidence and the degree of relation by ancestry*" (ibidem, p. 32).

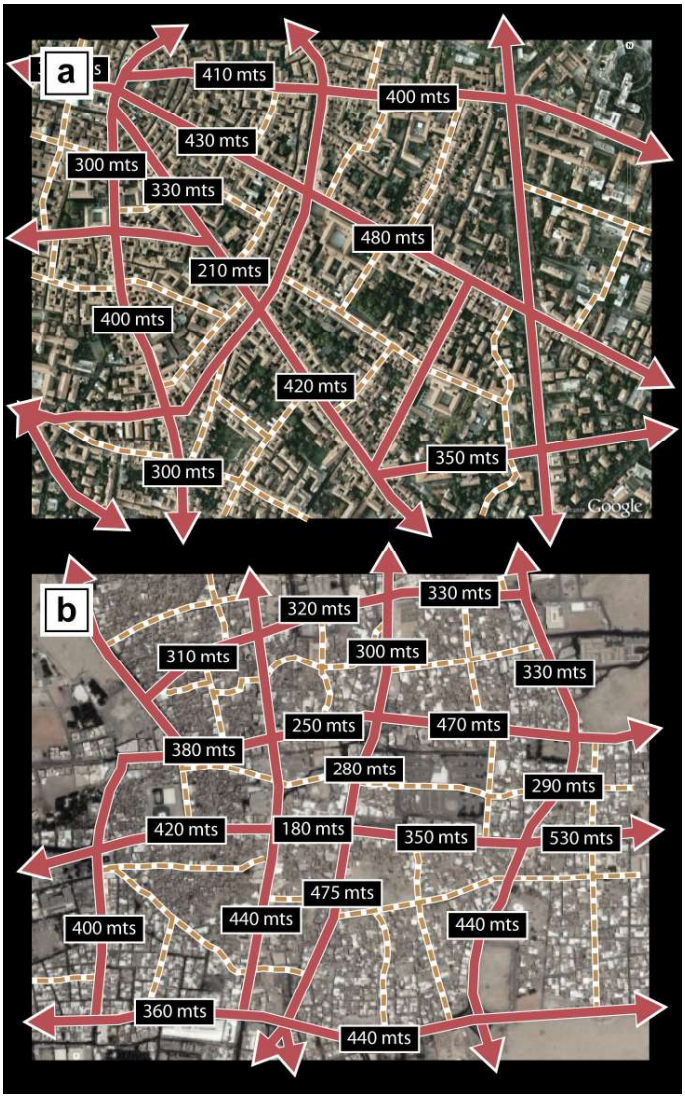
In this paper, we deal with the morphological similarity, not the decent, of urban cases, with the aim of contributing to a science of the classification of urban form. According to MacLeod (MacLeod, 2002), "*morphological data are regarded as being of significance in systematics because morphological variation is believed to be characterized by gaps between taxa. The presence of these gaps makes each taxon uniquely diagnosable and their hierarchical structure reflects action of morphological change superimposed on the evolutionary process of ancestry and descent. These gaps may arise as a result of a number of evolutionary processes, but their discovery, description, and interpretation represents the first and most basic task of all systematics research*".

The Urban Morphometrics analysis of forty-five "sanctuary areas"

Method

"*That there is order in nature is a presupposition of any scientific research*" (Borgmeier, 1957); however, "*nature is highly complex and the multiplicity of forms is oppressive*" (ibidem, p. 54). The co-presence in the real world of a universal structure and endless visible

Figure 2. The urban fabric defined by main streets: the Sanctuary Area.
The pattern of main streets (thick solid red) and sanctuary areas (on the background, defined by main streets) in the cities of Bologna, IT (a), and Al Hofuf, SA (b). Local main streets (dashed orange) emerge regularly within sanctuary areas as denser shortcuts connecting the higher network of main streets. Source: Mehaffy et al. (2010)



diversity is the signature of life. "*Diversity and unity are the two underlying themes that seem to characterize all life*" (Savage, 1963). Any classification is the attempt to reproduce the stable and recurrent part of the dualism that sits outside of us, in the real world. It is, therefore, structural in nature. *Urban morphometrics* is our attempt to understand (reproduce) the permanent and universal structure of cities, the one that lays the ground for the amazing diversity of their visible forms.

We firstly determine the appropriate OTU. The OTU must be: a) universally present in all cities; b) large enough to represent a complete spectrum of all constituent elements of urban form, such that their homologous characters can be rigorously defined and measured; c) small enough to be morphologically specific; d) functionally recognizable, at its own scale, in the organizational structure of the city. The *Sanctuary Area* (SA) is the portion of urban form enclosed by intersecting Urban Main Streets (Mehaffy et al., 2010) (Fig.2). The SA can be determined objectively, consistently and internationally (Porta et al., 2014), therefore it complies to the criteria above and has been adopted as the OTU

of this study. For the purpose of this paper, forty-five SAs are studied in 45 cities, 40 of which in the UK. All the case studies are named after the city to which they belong, but they do only represent one SA within that city.

The homologous characters of urban form are features of the SAs basic elements, in the same way that the leaf edge in a plant is a feature of one basic element of the plant, the leaf. Characters have been selected according to three criteria: a) being acknowledged in literature as significant features of urban form and evolution; b) being detectable universally across all types of SAs of all cities of all times; b) being measurable remotely through on-line mapping repositories such as Google Maps, OpenStreetMap and, in the UK, Ordnance Survey Maps. Many of these elements and characters (Tab.1) are common in urban morphology literature; however, some are innovative: for example, we distinguish between *Regular Plots* and *Internal Plots* where, contrary to the latter, the former have a primary edge on, or access from, a public street. A significant work was required to redefine univocally, as much as possible, elements and characters of the taxonomic structure that have been so far extensively used in the literature, such as *street, block, plot, building density, built front, street edge* etc., whose definition has nevertheless so far been treated either informally or inconsistently, if not omitted altogether.

Ultimately, 75 homologous characters were extensively measured by means of 207 *variables*, spanning from, for example, the *built-front ratio* of the blocks to the *covered area ratio* of the plots, or the *ingress/egress ratio* of the SA. A total of 45 SAs were selected from an equal number of different cities, 40 of which are in the UK. Each SA was accurately mapped in a Geographic Information System (GIS) environment: all 2D characters such as Building coverage were identified spatially on the map, while 3D characters such as Building Height were added after inspection through Google Street View, or similar publicly available on-line repositories; the database relative to the SA was finally stored in a Microsoft Excel format. Once the overall database of all the 45 SAs was completed, an additional 5 further cases were prepared to be used as "unknown" cases: of these, 4 are European non-UK, and 1 (Tripoli) is an Arabic historical centre from north Africa.

Data mining has been approached here in a rather conventional way, by extensive manpower deployment. However, the method itself has been accurately designed to support further developments in areas such as remote sensing and big data as pertinent to urban morphology (Carneiro et al., 2010). This applies to all phases of the research. For example, all information utilized in this research is achieved remotely, without direct site analysis, and all procedures of data management and treatment have been brought to a standard where automation could be directly applicable.

Any assertion regarding the scale of the OTU, its characters and character states, needs to be tested and validated against a clear set of criteria. It is important though that such

Table 1. Taxonomic structure.
The complete structure is here presented only for the case of Regular Plots

OTU	Elements			Category of character
Sanctuary Area				(1)(2)(3)(4)(5)
	Streets			(0)
		Urban Mains		(1)(5)(6)
		Internal Streets		(1)(5)(6)
			Local Mains	(1)(5)(6)
			Locals	(1)(5)(6)
	Blocks			(1)(2)(3)(4)(6)
		Regular Plots		(1)(2)(3)(5)(6)
		Internal Plots		(1)(2)(3)(5)(6)
		Internal Ways		(3)
		Open Space		(3)
		Natural Areas		(3)

'Legend: (1) Size; (2) Shape; (3) Composition; (4) Density; (5) Usage; (6) Arrangement; (0) No metrics

Category of character	Character	Unit of measure	Variable
(1) Size	Regular Plots Area	m^2	*Variables...*
(2) Shape	Regular Plot Compactness Index	m^2/m^2	*Variables...*
(2) Shape	Regular Plot Rectangularity Index	m^2/m^2	*Variables...*
(3) Composition	Regular Plots per Block	n	*Variables...*
(5) Usage	Regular Plot Residential Use Ratio	m^2/m^2	*Variables...*
(5) Usage	Regular Plot Non-Residential Use Ratio	m^2/m^2	*Variables...*
(5) Usage	Regular Plot Mixed-Use Ratio	m^2/m^2	*Variables...*
(5) Usage	Regular Plots Service Use Ratio	m^2/m^2	*Variables...*
(5) Usage	Regular Plot Recreational Use Ratio	m^2/m^2	*Variables...*
(6) Arrangement	Regular Plots Extension on Street	m	*Variables...*
(6) Arrangement	Regular Plot Covered Area Ratio	m^2/m^2	*Variables...*
(6) Arrangement	Regular Plots per 100m Urban Mains	n/m	*Variables...*
(6) Arrangement	Regular Plots per 100m Local Mains	n/m	*Variables...*
(6) Arrangement	Regular Plots per 100m Local Streets	n/m	*Variables...*

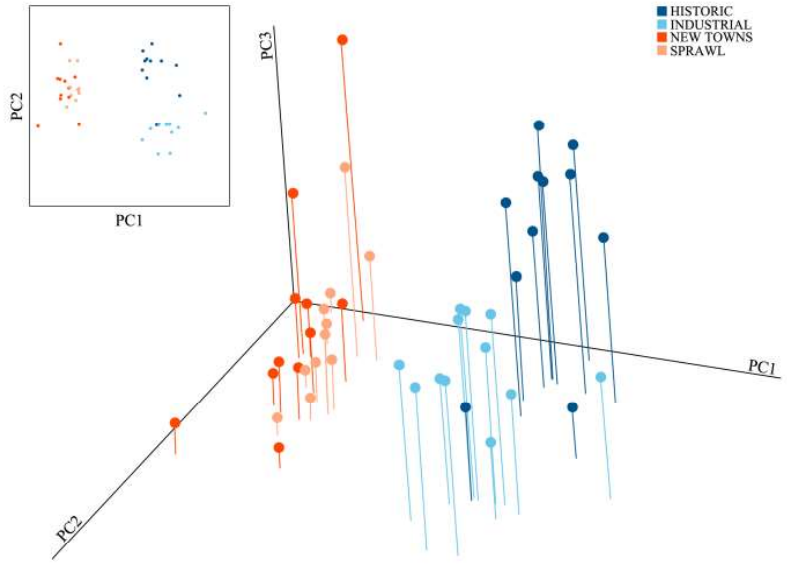
validation theory is in some way readily available to the common sense as much as the distinction between a wing and a beak is. In our study, we propose the validation of our system be the historical origins of the case studies. It is common knowledge since the dawn of urban morphological studies (Poëte, 1924-1931), that the historical origin of an urban area has a direct and enduring impact on its evolution over time. Scholars in urban morphology have extensively treated the typical character of an urban area with the notion of "*morphological period*" (Conzen, 1960, Whitehand, 1987): still today we talk for example of the "medieval core" of a city, or its "baroque district". What distinguishes urban fabrics of different *historical origins* goes beyond architectural language, and is inherent to their long-lasting morphological *structure*. For example, there is evidence that the street layout is among the most resilient components of urban form, as well as the plot structure, which is directly linked with it (Strano et al., 2012, Moudon, 1986). These have a direct influence on other crucial elements such as street centrality, building types, density and land uses (Caniggia and Maffei, 2001, c.1979). We need to establish a system of measurements that allows urban form to be classified in taxa that are *distinct* in terms of their historical origin.

For this study, we identified highly distinguishable historical origin groups in order to make the test as divisive as possible. These are: a) *Historical*: pre-modern compact town centres; b) Industrial: compact working class housing from the late 19th and early 20th century; c) *New Towns*: modernist large-scale mostly public developments; d) *Sprawl*: corporate low-density/low-rise suburbs. The four historical origin groups also belong to the two higher taxonomic levels of pre and post war developments, and are representative of clearly distinct building traditions and urban design models. The selection of SAs was informed by extensive literature review. Cases (Tab.2) were only included if they: a) were widely acknowledged in the literature to be representative of the typical form of their time of origin, and b) demonstrated in their contemporary appearance a reasonably homogeneous expression of that form. All cases in fact, no matter their historical origins, are contemporary "living" urban environments. If our approach was sufficient to distinguish *between* these four groups and yet identify similarities *within* them, then there would be sufficient evidence that in fact the OTU, scale, characters and metrics utilized are ap-

Table 2. List of cases and their historical origins.
Cases are Sanctuary Areas nominated after the city they belong to

N.	Origin Group	Sanctuary Area	Country
1	Historic	Aberystwyth	Wales, UK
2	Historic	Berwick-upon-Tweed	England, UK
3	Historic	Caernarfon	Wales, UK
4	Historic	Carlisle	England, UK
5	*Historic*	*České Budějovice*	*Czech Republic*
6	Historic	Chester	England, UK
7	Historic	Chichester	England, UK
8	Historic	Conwy	Wales, UK
9	Historic	Edinburgh	Scotland, UK
10	Historic	Norwich	England, UK
11	*Historic*	*Tripoli*	*Libya*
12	Historic	York	England, UK
13	*Industrial*	*Berlin*	*Germany*
14	Industrial	Bolton	England, UK
15	Industrial	Castleford	England, UK
16	Industrial	Glasgow	Scotland, UK
17	Industrial	Leicester	England, UK
18	Industrial	Liverpool	England, UK
19	Industrial	Manchster	England, UK
20	Industrial	Middlesbrough	England, UK
21	Industrial	Newcastle-upon-Tyne	England, UK
22	Industrial	Preston	England, UK
23	Industrial	Skipton	England, UK
24	*New Town*	*Albertslund*	*Denmark*
25	New Town	Basildon	England, UK
26	New Town	Cumbernauld	Scotland, UK
27	New Town	East Kilbride	Scotland, UK
28	New Town	Glenrothes	Scotland, UK
29	New Town	Harlow	England, UK
30	New Town	Hatfield	England, UK
31	New Town	Livingston	Scotland, UK
32	New Town	Milton Keynes	England, UK
33	New Town	Runcorn	England, UK
34	New Town	Skelmersdale	England, UK
35	Sprawl	Balloch (Inverness)	Scotland, UK
36	Sprawl	Blythe Bridge	England, UK
37	Sprawl	Boston Spa	England, UK
38	Sprawl	Dudsbury	England, UK
39	*Sprawl*	*Lyon*	*France*
40	Sprawl	Milltimber	Scotland, UK
41	Sprawl	Newton Mearns	Scotland, UK
42	Sprawl	Penyrheol	Wales, UK
43	Sprawl	Syston	England, UK
44	Sprawl	Upton	England, UK
45	Sprawl	Winterbourne	England, UK

Figure 3. Principal Component Analysis (PCA) of the 45 sanctuary areas
The Principal Component Analysis reveals that there is sufficient information to describe the underlying behaviour of the data in as few as the first three Components alone. PC1 accounts for a neat separation between cities with pre or post war origins and PC2 acts in separating between the four origin groups. There is also information held in PC3 contributing in the separation between origin groups, especially between New Towns and Sprawl. The 3D scores plot shows these three tiers of separation and the 2D scores plot gives a very clear view of the inherent groupings of the case studies.



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propriate. These claims are validated through several multivariate statistical analyses that are presented in the next section.

Principal Components Analysis (PCA) is one of the oldest and most largely used techniques for multivariate data analysis (Hair et al., 2006). It is widely employed by statisticians in a range of disciplines and is applicable in many scientific studies with various types of data. As a form of *Exploratory Data Analysis* (EDA), it is used at a preliminary stage in statistical analyses to reveal whether there are any groupings in the data, outliers or dominant trends (Brereton, 2009). *PCA* aims at reducing a set of observations characterized by a large number of possibly correlated variables into a set of values characterized by a smaller number of uncorrelated Principal Components, yet accounting for a sufficient amount of the variability in the data. These Principal Components represent linear combinations of the original variables and can be considered as variables themselves in *EDA*. Therefore, rather than trying to understand the behaviour of the data measured against 45 case studies in 207 dimensions (the number of variables utilized to measure our 45 SAs), *PCA* allows for a much more straightforward analysis, in fewer dimensions, utilising only the first few Principal Components. The *PCA* makes it possible to reveal the underlying characteristics and relationships in the structure of the data, in a way that is straightforward to observe graphically in two or three-dimensional charts. In our case (Fig.3), *PCA* allows us to make two important observations: first, that the 45 cases neatly cluster according to their historical origins, which satisfies the validation theory; and second, that a quite sharp distinction emerges between pre and post war cases with respect to the selected Principal Components.

A Cost Benefit Analysis (*CBA*) is developed for this study in order to analyse the relative benefit of including more variables, in a parallel effort to reveal which variables are most important in the morphometric analysis of urban form; with "most important" we mean, in the context of this research, most *discriminatory* (Fig.4): in short, we explore what is the contribution of each variable in distinguishing cases according to the four historical origin groups. *CBA* utilises the *Fisher Weight* measure to rank the variables based on their overall discriminatory ability between the four origin groups. *CBA* proceeds iteratively to

Table 3. List of the 9 top-ranked variables in the Cost Benefit Analysis.
Their cumulative representation of the variability in the data overall goes beyond the 90%.

CBA Ranking	Character	Variable
1	Block Built Front Ratio	Interquartile Average
2	Block Covered Area Ratio	Interquartile Average
3	Block Covered Area Ratio	Maximum
4	Local Street Built Front Ratio	Interquartile Average
5	Block Built Front Ratio	Maximum
6	Regular Plot Covered Area Ratio	Interquartile Average
7	Urban Main Built Front Ratio	Interquartile Average
8	Sanctuary Area Regular Plot Ratio	Ratio
9	Urban Main Built Front Ratio	Maximum

test for correct classification (using a *Linear Discriminant Analysis*) of cases when analysed using only the first top-ranked variable, then the first and the second, and so on (Brereton, 2009). This proceeds iteratively for the top 100 variables repeated for 100 test and training data set splits, representing one third and two thirds of the total case studies, respectively. We observe that the variables ranked in the top 9 positions of *CBA* (Tab.3) allow for over 90% average correct classification rate in relation to the four origin groups.

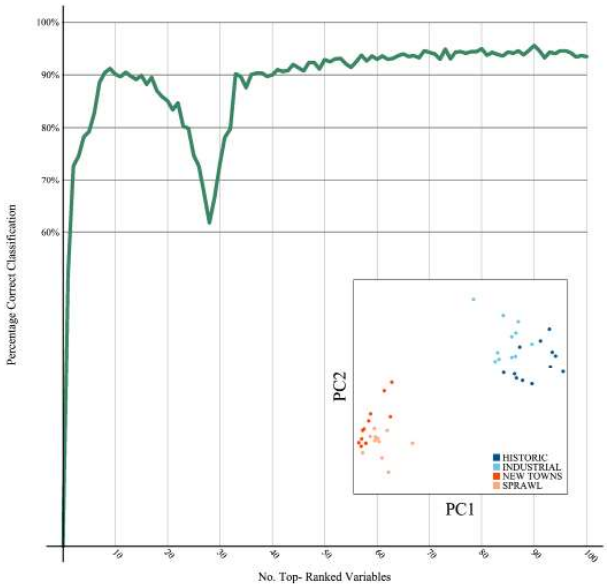
These top variables make evidence of the extent to which buildings line up in close proximity to the block's perimeter as opposed to showing significant setback, and how this phenomenon occurs over local rather than main streets; or the way buildings are laid out within the block, either covering much of it or just a little; or the extent to which regular plots are characteristic of the SA's composition as opposed to internal plots. It is worth noting that the high discretionary capacity of such characters seems to express quite neatly the inherent opposition that has marked the intellectual history of urban design models as applied in particular to the ordinary urban environment, in the crucial passage from the pre-modern age of master-builders to that of advanced artists/professionals, or "Palladio's children" (Habraken, 2005). In particular, these characters distinguish the traditional compact urban form from the various post-war expressions of the garden city and the towers-in-the-park models (Hall, 2002, c.1988). Interestingly, in respect to correct classification rates between pre and post war fabric, there is 100% correct classification regardless of the number of variables considered. Moreover, we show in the inset of Fig.4 the scores plots of the first two Principal Components resulting from only the 9 top-ranked variables: the visible separation between the four groups is still quite strong, except for a few outliers that can in fact be easily explained by looking at their specific form.

Conclusions

Taking lessons from biological morphometrics, in this study we aim primarily at establishing a method for the classification of urban form, that we name *urban morphometrics*. For this purpose, we propose here the fundamental elements of such method, and apply it to the 45 real-world urban cases. We then undertake a multivariate statistical analysis of the dataset. Findings show that: a) overall, the method appears to perform very well in clustering cases in a way that highly correlates with their historical origins; b) it is possible to derive a very neat clustering of cases' by using just the 9 variables previously mentioned; c) a clear distinction emerges in particular between pre and post-WWII cases. Through this study we lay the basis for the further investigation of similarity between the identified taxa: while phenetic *similarity* is not always congruent with phylogenetic relationships, it is nevertheless often an indication of them.

We find four major directions for the further development of this work. Firstly, urban morphometrics must be tested more extensively; that implies the development of a reliable protocol of data mining that takes advantage of technologies of remote sensing and image processing over big data on-line repositories. Secondly, the SAs' profile can be further investigated, for example in terms of their organizational, developmental, regulatory, functional and emergent non-reducible features (Savage, 1963). Thirdly, reflection must be

Figure 4. The Cost/ Benefit Analysis applied in this study incorporates the Fisher Weight test of overall discriminatory ability of the 207 variables in distinguishing between origin groups. Essentially, this reveals the most important metrics of form and orders them. With only 9 variables, an average percentage of correct classification of over 90% was demonstrated. The two-dimensional *PCA* scores plot in the inset shows that with only 9 variables there is still a remarkably clear distinction between pre and post-war developments. Compared with the *PCA* of 207 variables shown in fig. 2 (inset), there is not as strong of separation between the two pre-war origin groups, which in any case still form compact and distinct clusters. However, the distinction between the post-war origin groups has improved as the clusters have become slightly more compact and distinct.



put in the multi-scalar nature of cities, of which the scale of the sanctuary area represents one level. Finally, significant work must be undertaken before a reliable and universally accepted set of characters and variables can be considered achieved; further investigation is needed in particular to distinguish finer-grained taxa within the two camps of pre and post war urban fabrics, and even within the four origin groups identified in this study.

References

Adams, D. C., Rohlf, F. J., & Slice, D. E. (2013). A field comes of age: geometric morphometrics in the 21st century. *Hystrix, the Italian Journal of Mammalogy,* 24(1), 7-14.
Alexander, C. (2004). *Sustainability and morphogenesis: The birth of a living world.* Paper presented at the Schumacher Lecture, Bristol, UK.
Bookstein, F. L. (1993). A brief history of the morphometric synthesis. In L. F. Marcus, E. Bello, & A. García Valdecasas (Eds.), *Contributions to morphometrics*, Vol. 8, (GRAFICAS MARCAR, S. A, Madrid) 15-40.
Borgmeier, T. (1957). Basic questions of systematics. *Systematic Zoology*, 6(2), 53-69.
Brereton, R. (2009). *Chemometrics for pattern recognition* (John Wiley & Sons).
Caniggia, G., & Maffei, G. L. (2001, c.1979). *Architectural Composition and Building Typology: Interpreting Basic Building* (Alinea, Florence).
Carneiro, C., Morello, E., Voegtle, T., & Golay, F. (2010). Digital urban morphometrics: automatic extraction and assessment of morphological properties of buildings. *Transactions in GIS*, 14(4), 497-531.
Cataldi, G., Maffei, G. L., & Vaccaro, P. (2002). Saverio Muratori and the Italian school of planning typology. *Urban Morphology*, 6(1), 3-14.

Conzen, M. P. (2001). The study of urban form in the United States. Urban Morphology, 5(1), 3-14.
Conzen, M. R. G. (1960). Alnwick, Northumberland: a study in town-plan analysis. *Transactions and Papers (Institute of British Geographers)*, iii-122.
D'Arcy Thompson, W. (1942, c.1917). *On growth and form.* New York: McMillan.
Darin, M. (1998). The study of urban form in France. *Urban Morphology*, 2(2), 63-76.
Dawkins, R. (2006, c.1976). *The selfish gene* (Oxford university press).
Gordon, A. D. (1996). Hierarchical classification. In P. Arabie, L. J. Hubert, & G. De Soete (Eds.), *Clustering and classification* (World Scientific) 65-121.
Gu, K., & Zhang, J. (2014). Cartographical sources for urban morphological research in China.
Habraken, N. (2005). Palladio's Children, seven essays on everyday environment and the architect. Edited by Jonathan Teicher, (Oxford UK, Taylor & Francis).
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (Vol. 6): Pearson Prentice Hall Upper Saddle River, NJ.
Hall, P. (2002, c.1988). *Cities of tomorrow: an intellectual history of urban planning and design in the twentieth century* (Blackwell Publishing).
Heywood, V. H. (1976). *Plant taxonomy*: London: Edward Arnold 63p.(Institute of Biology's Studies in Biology no. 5)-Illus.. General (KR, 197600023).
Ibarz, J. V. (1998). The study of urban form in Spain. *Urban Morphology,* 2(1), 35-44.
Jeffrey, C., & Heywood, V. H. (1977). *Biological nomenclature* (Edward Arnold London).
Kaufman, L., & Rousseeuw, P. J. (2005). Finding groups in data: an introduction to cluster analysis. 2005 (John Wiley & Sons, Inc).
Klingenberg, C. P. (2002). Morphometrics and the role of the phenotype in studies of the evolution of developmental mechanisms. *Gene*, 287(1), 3-10.
Legendre, P., & Legendre, L. (1998). Numerical ecology: second English edition. *Developments in environmental modelling, 20*.
MacLeod, N. (2002). Phylogenetic signals in morphometric data. *Morphology, shape and phylogeny,* 100-138.
Manktelow, M. (2010). *History of taxonomy*. Lecture from Dept. of Systematic Biology, (Uppsala University).
Marshall, S. (2008). *Cities Design and Evolution* (Routledge).
Mehaffy, M., Porta, S., Rofè, Y., & Salingaros, N. (2010). Urban nuclei and the geometry of streets: The 'emergent neighborhoods' model. *Urban Design International,* 15(1), 22-46. doi:10.1057/udi.2009.26
Moudon, A. V. (1986). *Built for change: neighborhood architecture in San Francisco* (Mit Press).
Muratori, S. (1960). *Studi per una operante storia urbana di Venezia* (Istituto Poligrafico dello Stato, Roma)
Pagel, M. (2012a). Evolution: adapted to culture. *Nature*, 482(7385), 297-299.
Pagel, M. (2012b). *Wired for culture: The natural history of human cooperation* (Penguin UK).
Poëte, M. (1924-1931). *Une vie de cité: Paris de sa naissance à nos jours*: A. Picard.
Porta, S., Romice, O., Maxwell, J. A., Russell, P., & Baird, D. (2014). Alterations in scale: Patterns of change in main street networks across time and space. *Urban Studies*, 51(16), 3383-3400. doi:10.1177/0042098013519833
Reyment, R. A. (2010). Morphometrics: an historical essay *Morphometrics for Nonmorphometricians* (Springer) 9-24.
Richerson, P. J., & Boyd, R. (2008). *Not by genes alone: How culture transformed human evolution* (University of Chicago Press).
Rohlf, F. J., & Marcus, L. F. (1993). A revolution morphometrics. *Trends in Ecology & Evolution*, 8(4), 129-132.
Roth, V. L., & Mercer, J. M. (2000). Morphometrics in development and evolution. *American Zoologist*, 40(5), 801-810.
Savage, J. M. (1963). *Evolution* (Holt, Rinehart and Winston, New York).
Siksna, A. (2006). The study of urban form in Australia. *Urban Morphology*, 10(2), 89.
Simpson, G. G. (1961). *Principles of animal taxonom* (Columbia University Press).

Sneath, P. H., & Sokal, R. R. (1973). *Numerical taxonomy. The principles and practice of numerical classification* (W.H.Freeman & Co Ltd).
Steadman, P. (2008). *The Evolution of Designs: Biological analogy in architecture and the applied arts* (Routledge).
Strano, E., Nicosia, V., Latora, V., Porta, S., & Barthélemy, M. (2012). Elementary processes governing the evolution of road networks. *Scientific Reports*, 2. doi:doi:10.1038/srep00296
Whitehand, J. (2001). British urban morphology: the Conzenion tradition. *Urban Morphology*, *5*(2), 103-109.

Urban Morphology Theories and Methods

Urban Form and Theories
Urban Form and Meanings
Reading Urban Form
Urban Morphology Methods
Fringe Belt Analysis

Chair_Teresa Marquito Marat-Mendes
University of Porto, Portugal, Instituto Universitário de Lisboa, DINÂMIA'CET-IUL, Lisboa, Portugal
Co-Chair_Ylli Taci
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Form and Theories

Urban Form and Meanings

Reading Urban Form

Urban Morphology Methods

Fringe Belt Analysis

The morphological relationship between the plot pattern and street facade in the new urban area of Nanjing, China.

Quan Liu, Ziyu Tong
School of Architecture and Urban Planning, Nanjing University, Nanjing, China
Keywords: Plot pattern, street facade, new urban area, modern urban planning

Abstract

This research explores the methodological, instrumental and conceptual possibilities of the systemic approach developed in quantum physics and mathematics: urban centers are complex systems that function as nodes articulating human activities networks in the territory, in a dialectical relations Abstract

The street façade encloses and defines the street space, which also affected by the plot pattern. In the traditional city, the block was usually divided into a series of plots with the same original plot width alone the street and the module of the plot width closely relates to the dimensions of early houses. The similar type of buildings occupied the plot heads at the street- line forming the successive or regular street facade. Contrastively, in the new urban area of Chinese city, the block and plot division is much more based on the land use distribution and transportation demand. Furthermore, with the great diversification of building types, the plot pattern and building fabric are more connected by index of land use intensity, set back of plot boundary, or building regulation of fire case, etc. Therefore, their relationship becomes not as clear as in the traditional city and we hardly see the traditional consistent form of the street facade in the new urban area. Since the street space is important for the urban life, understanding how the plot pattern influences the formation of the street facade in the new urban area can be very helpful to create a better urban space.

Hexi, constructed after 1990s in the rural area with modern planning in Nanjing, China, is a typical new urban area. This paper chooses the central part of Hexi, which contents 232 blocks with rare historic influence, to analyze the morphological relationship between the plot pattern and the street facade under the modern planning control. Firstly, the paper set the Relative Standard Deviation as the quantitative index for measuring the uniformity of the street facade. And the calculating strategy is set according to the building pattern. Then, the relationship among the RSD of the block boundary, land use, and the block division is proved through statistics. The result shows that the plot pattern is an important factor which influences the street façade. The reasonable block division contributes not only to optimize utilization of urban lands, but also to achieve the well-organized street space.

Introduction

As an important type of the urban public space, urban street space is closely related with people's daily life. The urban street space is identified by the buildings facades on the both sides of the street, so the urban street facade is looked upon as an important element in urban public space molding. Meanwhile, the plot and land use pattern of the block are generally determined before buildings construction. The limit effect that the plot and land use pattern produce on the buildings form and layout has direct influence on the morphology of the street façade. It can be said that the street facade reflects the interrelationship among the three basic elements of urban morphology – street, plot, and building.

The close correlation among these three basic elements is also reflected in the continuous and homogeneous street facade of the traditional cities. The street facades are mostly divided equally by the plots. The subsequent division also mainly follows the principle of equal division to generate a frontage width pattern of a certain modulus (Conzen, 1960; Slater, 1987). This division approach corresponds with the traditional residence whose type and scale are relatively consistent within one block. In the same condition, the block with the plot pattern of narrow width and long depth can accommodate more street plots. Meanwhile, the narrow width also prompts the buildings to be prone to occupy the street facade of the plot, which shows the close relationship between the buildings and street.

In the cities planned from modernism, the street walls in the traditional cities are broken to be heterogeneous, manifesting the weakened relationship among the street, plot, and building. In terms of the plot, the new building type requires more in-plot open spaces for such demands as circulation organization, fire protection, ventilation and sunshine, which not only expands the plot, but also weakens the morphological relationship between the plot and building. In terms of the plot pattern of the block, the block needs to accommodate buildings of different types, and the value that the frontage is for the buildings within the plots is reduced by the larger size and smaller number of the plots.

Philippe Panerai (2004) has demonstrated this transition in Formes Urbaines with five cases from the Western cities. As one of the areas with the highest speed and largest scale of global urbanization in the past 30 years, the rapidly expanded new urban area of China also experienced the same transition as to the street facade. Although many

a. RSD with the amount of plots

b. RSD with the amount of plots and landuse

Figure 1. Calculation strategy of RSD

studies have investigated the relationship between the plot pattern and building texture, they focused on the traditional urban spaces of China and the West instead of the street façade (Siksna, 1997; Deng and Mao, 2003). Some studies on the street facade mainly introduce the characteristics of the street facade, without discussing the relationship between it and the plot pattern (Cooper, 2005; Cooper and Oskrochi, 2008). However, it is necessary to study this relationship if we expect to create a street space suitable to the new urban area of China.

Based on a typical case of a new urban area of contemporary China, this paper focuses on, in terms of the block scale, analyzing the morphological relationship between plot pattern and street façade. It involves the evaluation of the street façade, the division modes of the block, and the land use of the block.

Methodology

To study the relationship between the street facade and plot pattern, the plot patterns of blocks need to be classified, which include how the block is divided into plots by the planner, and the number and land utilization of plots within the block.

We defined a strategy for expressing the street facade in a quantitative method. Generally, the qualitative description prevails in the expression of the street facade, which is either a continuous street wall or disorderliness. This qualitative description is difficult to be applied to the establishment of the association relation because of its strong ambiguity and uncertainty. Therefore, setting quantitative indexes is contributive for the accurate expression of the street facades of different types, so that the study on the association relation can be facilitated.

Overall, the street facade is perceived as being at a status between the completely continuous and completely disorderly. The pattern reflected in terms of the street facade actually is the continuity and homogeneity of the building facade. The common facade studies generally express the two-dimensional plan of the street facade and take the length and set back distance as the measure indexes (Ding and Tong, 2011). Actually, this cannot reflect the three-dimensional attribute of the street facade, that is, the height information of the building facade. The height information is indispensable for perceiving the street space. Therefore, we try to measure the pattern of the street facade with the area of the building facade as the basic element.

A street facade generally consists of several buildings. For a residential block, the buildings are similar in the building volume and form from the views of both facade and side elevation. In terms of the street facade, this reflects that all building facades have similar areas. For the block with mixed land use, the buildings may be greatly different in the building volume and form, reflecting in terms of the street facade that the areas of the building facades are widely diverse. These two situations respectively correspond to the continuous facade and disorderly facade. Figure 1 (a-d) presents the different statuses of the street façade.

In statistics, the most important method of calculating the dispersion degree of numerical data is Relative Standard Deviation (RSD). This study uses the RSD as the quantitative index for measuring the uniformity degree of the street facade. The formula for calculating the RSD is as follows:

$$\mathrm{RSD} = \sqrt{\sum_{i=1}^{n} (A_i - \bar{A})^2 \div n} \div \bar{A}$$

In the formula, Ai is the area of the ith building facade, is the average area of the building facades, and n represents the number of the building facades.

The closer the RSD to zero, the more similar the areas of the building facades are, and

Figure 2. The study case of central Hexi in Nanjing, China

a. The study case of central Hexi in Nanjing, China

b. Landuse and block division of built blocks

the higher the continuity and uniformity degree of the street facade is. However, the higher the RSD is, the more diverse the areas of the building facades are, and the more disorderly the street facade seems.

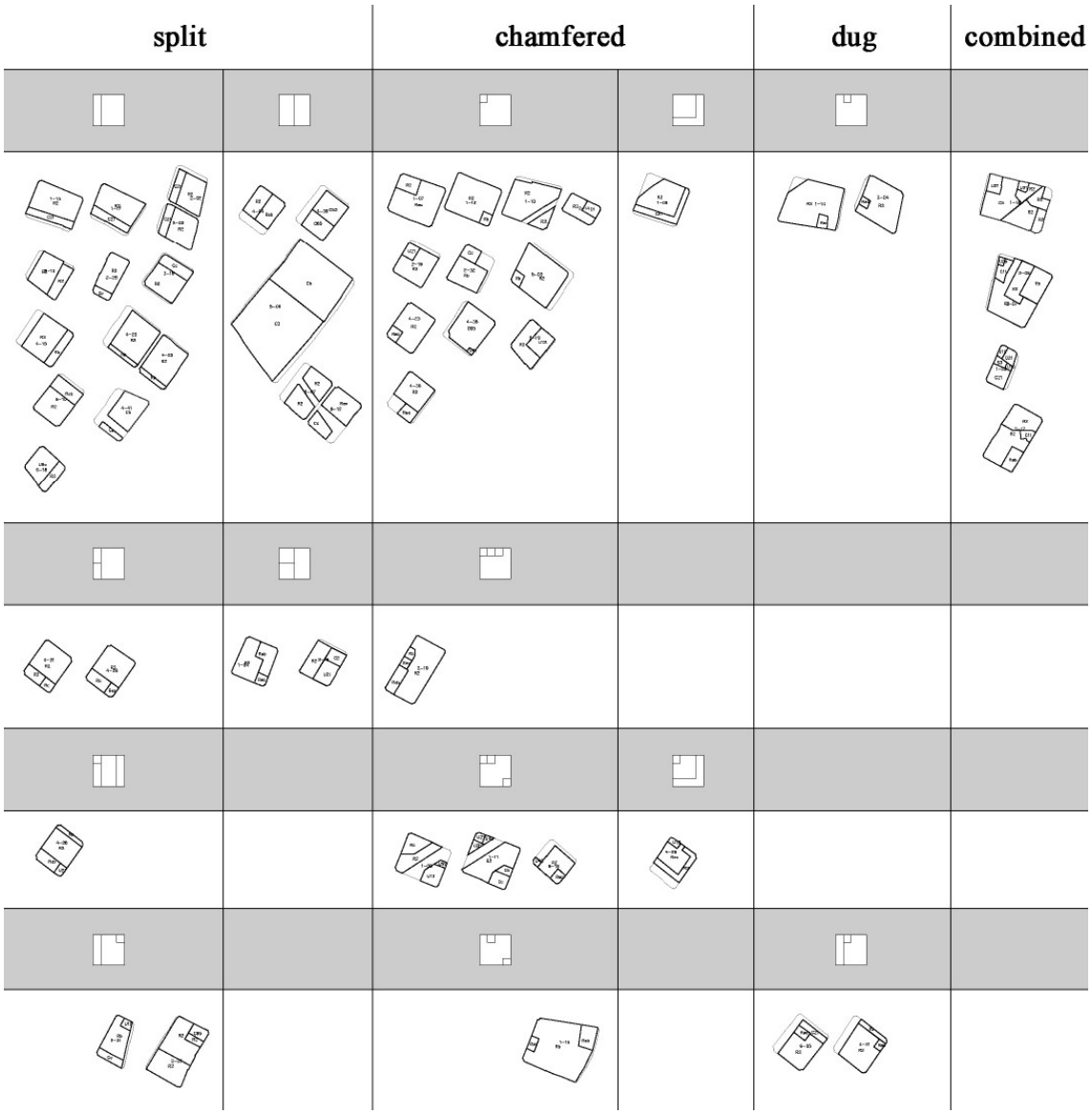
In actual calculation, we only select the building facades along the street as the calculating object, and generally select the facades forming a smaller angle with the street. When both high-rise buildings and podiums exist, the RSD of them should be calculated separately if they are not on the same vertical plane or they have greatly different facade form even though they are on the same vertical plane. They can be regarded as one calculating object if they are on the same vertical plane with a uniform form (Figure 1 e-f).

Based on the RSD, the quantitative index for evaluating the street façade, and considering the block division and land use of plot pattern, this study worked out the correlation among the three basic elements through statistics analysis.

Case study

Nanjing is a city of China on the south bank of Yangtze River, with a long history of more than 2000 years. Before 1949, its built-up area was mainly within the city walls constructed in the Ming Dynasty (1368-1644). Hexi area was a spindle beach area located on the southwest of the traditional urban area of Nanjing, which is gradually formed by the movement of the stream way of Yangtze River to north. It is a very typical new urban area of China, whose construction was basically synchronous with the establishment and perfection of the control system for urban planning and construction in China. According to the time sequence of construction and development, Hexi area is divided into northern, middle and southern parts. The construction of many sections of the northern part has been completed before 1990 when the regulatory plan was conduct as this part is near to the old urban area. Therefore, the planning of this part was greatly influenced by the existing form. The regulatory plan of the southern part was also completed, but the construction is still in the initial stage. The planning and construction of the middle part started in 2000 based on the vision of an ideal urban central area. Now, it has a relatively complete urban form and function, and can be a typical case for us to explore China's

Figure 3. Division of street blocks



modern urban planning and related practice (Figure 2a). Meanwhile, the study on the relationship between plot division and building texture is also representative.

Division of street blocks

The case consists of 232 planned street blocks, with a total area of about hectares. Among the 232 street blocks, 22 blocks are planned to be used for the urban green space (non-constructive blocks), 85 blocks are to be constructed or being constructed, and the remaining 128 blocks are the constructed blocks on which this study focuses. These constructed blocks include 229 constructive plots, except the green space and water surface.

Each of the 128 street blocks contains on average 1.8 plots. There are 73 street blocks containing only one constructive plot, accounting for 57%; 30 blocks containing two constructive plots, accounting for 23%; 13 blocks containing three constructive plots, accounting for 10%; 6 blocks containing four constructive plots, accounting for 5%; and only 6 blocks containing over five plots, which mainly are plots formed before planning (Figure 2b).

According to the results of street facade forming, division of blocks for the 55 multi-plot street blocks has three basic modes – split, chamfered, and dug, and a few combined modes based on the three basic modes. 26 blocks adopt the split mode, accounting for about 47%; 12 blocks adopt the chamfered mode, accounting for about 22%; only 2 blocks adopt the dug mode; and 15 blocks adopt the combined modes. As a result, the split and chamfered modes of division (and the corresponding combined modes) are most commonly used in planning of new urban area, which account for 76% (Figure 3).

Land use of plots

Land use of the plots determines the functions and morphological characters of the buildings, and the combination of the land use matters arrangement of the buildings along the street. Therefore, this study needs to make further analysis on the land use combination within the division modes of street blocks.

In the study on different land uses, we found that the residential plots and commercial & business plots form the vast majority of land use, and these two types show a great difference in the building form. Therefore, it is necessary to study them as two different categories. According to the further study on the residential plots, we also found a great difference in the building form of the residential buildings and residential facilities (such as community service and retail facilities, primary and middle schools, kindergartens and public facilities). This means that the residential plots may have multiple urban forms. Therefore, it's also necessary to study the residential plots and residential facilities separately. In addition, there is a small amount of plots for public facilities in the study area, and the green space is not in the study scope as there is no building in it.

The land use in this case is divided into four categories according to the building form: residential, residential facilities, commercial & business and others. Among the 73 street blocks containing only one plot, 38 blocks belong to the residential category, 4 belong to the residential facilities, 30 belong to the commercial & business and 1 belong to others. Among the 55 street blocks containing two or more than two plots, 6 blocks belong to the residential category, 14 belong to the mixed category of residential and residential facilities, 9 belong to the commercial & business and 16 are mixed blocks (Figure 2b).

Therefore, the land use can be further divided into six categories by further correlating the combination and boundary of the land use: residential, residential facilities, residential mixed, commercial & business, others, and mixed. "Residential mixed" means the situation that the categories of residential and residential facilities coexist, and "mixed" means the situation that the categories of residential commercial & business, and others coexist.

Calculation of the RSD

After simplifying the street blocks into polygons and segregating the boundaries of the blocks, 512 block boundaries are got from 128 blocks. The area of each building façade is calculated based on the width and height of street building corresponding to each boundary, and then the RSD of the street façade corresponding to a boundary can be worked out by Excel.

According to the calculation result, the average value of the RSD is 0.415, which means that the continuity and uniformity degree of the street façades in Hexi area is common. The minimum value of the RSD is 0, involving 93 boundaries, which account for 18% of the total amount of the boundaries, and the maximum value of the RSD is 1.446. In terms of distribution of the data frequency, Table 1 presents that, at an interval of 0.2, the amount of the block boundaries with a RSD smaller than 0.8 generally is around 90, distributing evenly; the amount of the block boundaries with a RSD greater than 0.8 is relatively less. Only 25 boundaries have a RSD over 1, accounting for 5% of all boundaries.

Table 1 Amount of the block boundaries with different RSD

RSD =0	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1.0	1.0-1.2	>1.2
Amount of boundaries	93	78	95	92	84	45	13	12

Result analysis

We imported all data into ArcGIS, connected the RSD values, land use, and division modes with the boundaries of the street blocks (Figure 4), and then exported a data sheet. This data sheet is the attribute table for the block boundaries in the study case. Based on this table, we worked out the direct relationship between the attributes through the statistics.

Table 2 Average RSD of the block boundaries with different land use and amount of plots

Land use	Average RSD of block boundaries					
	1 segment	2 segments	3 segments	4 segments	5 segments	Total
Residential	0.329	0.595	-	-	-	0.342
Residential facilities	0.363	-	-	-	-	0.363
Residential mixed	-	0.511	0.446	0.774	-	0.518
Commercial & Business		0.374	0.553	0.755	-	-	0.404
Others	0.421	-	-	-	-	0.421
Mixed	-	0.659	0.662	0.662	0.712	0.662
Total	0.350	0.581	0.642	0.737	0.712	0.415

Table 2 shows that, in terms of the land use, the blocks for residential have the smallest RSD, whose street facades have the highest uniformity degree, and the blocks for residential facilities, commercial & business, others, residential mixed and mixed follow successively. The mixed situation with the greatest RSD has a RSD value almost doubling that of the blocks for residential. This means that the mixed land uses are highly prone to cause a disorderly street façade.

In terms of division of block, the fewer plots a block contains, the smaller the RSD is, and the higher uniformity degree the street façade has. If a block contains only one plot, its RSD is smallest. Once a block is divided, its RSD would raise. The RSD would be 1.66 times as great as that of the block with only one plot, even though a block is divided into only two plots. The correlation between the two items is very clear.

We also found that, for the blocks contain more than one plot, the division modes also have obvious effect on the RSD value.

Table 3 Amount and average RSD of the block boundaries with different division modes

Division mode	Split	Chamfered	Dug	Combined	Total
Amount	65	38	4	26	133
RSD 0.561	0.565	0.604	0.701	0.591	

Figure 4. RSD values, land use, and blocks division

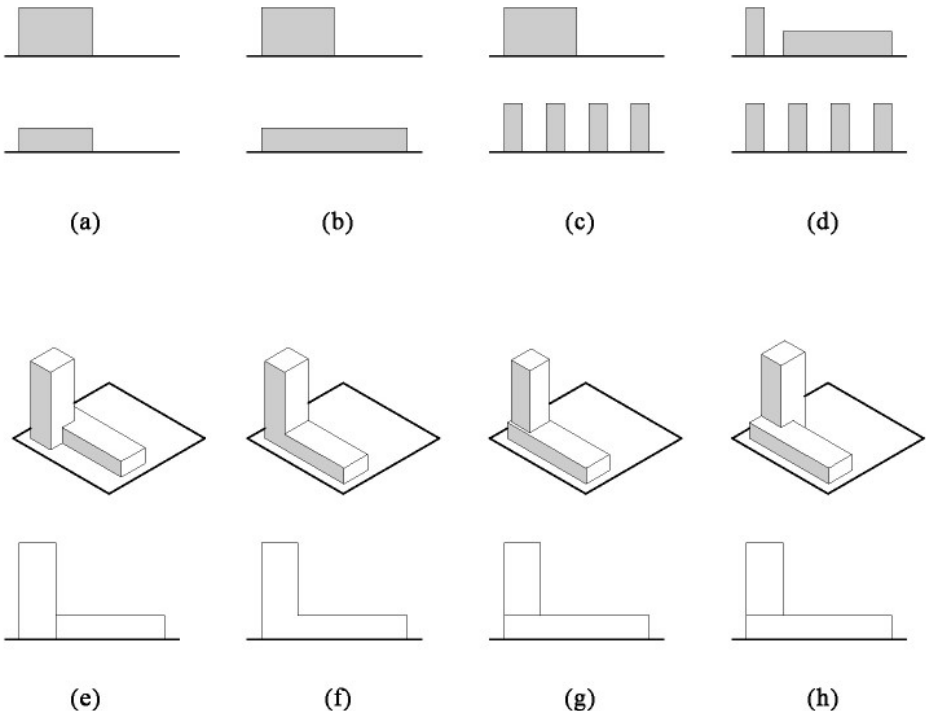


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Table 3 shows that, among the 133 block boundaries with segments, there are 65 boundaries in split mode, whose average RSD is 0.561; 38 boundaries in chamfered mode, whose average RSD is 0.565; 4 boundaries in dug mode, whose average RSD is 0.604; 26 boundaries in combined mode, whose average RSD is 0.701. The split mode generates the smallest average value of RSD, and the combined mode generates the greatest average value of RSD. Therefore, there also is a clear correlation between the block division mode and the uniformity degree of the street façade. And the split and chamfered modes are better than the other modes.

Conclusion

With the concept of Relative Standard Deviation in statistics, this study proposed a quantitative index for the uniformity degree of the street façade and improved the calculation strategy based on building distribution. Comparing with the traditional description of the street façade, this index increases the consideration of the information about the building height, so that the morphological relationship between the buildings on the street façade can be expressed more accurately, which is more consistent with people's perception to the street space.

This study proved the clear correlation among the block division, land use and RSD of the block boundary by working out these three items in the case of Hexi area of Nanjing, China. The result shows that, the fewer plots a block contains, the smaller the RSD is, and the higher uniformity degree the street façade has; the RSD of the block boundary for residential is smaller than that of the block for commercial & business, and the mixed block has the greatest RSD.

For the divided blocks, the division modes also have effect on the RSD value. From the view of the uniformity, the split mode is best, and then the chamfered mode and dug mode follow successively, the combined modes are the worst.

The result shows that the plot pattern is an important factor which influences the street

façade. The reasonable block division contributes not only to optimize utilization of urban lands, but also to achieve the well-organized street space.

Discussion

This study is just a preliminary result of the experimental study, and only adopts simplified calculation, ignoring many complex factors. So there is still a lot of work to do to meet the rigor of study. The calculation strategy of the RSD is the primary problem, because the angle between a building and a block boundary may vary greatly. Particularly, the angle between a building and a block boundary would be large when there is a large angle between the block and north-south direction. At this time, it is difficult to define the street façade. Additional, the relationship between the high buildings and podiums should also be considered. Therefore, the primary task following this study is to solve these problems with the RSD calculation strategy.

Currently, we have just made a study on the correlation among the RSD of the block boundary, block division and land use. However, for a whole street, only continuous block boundaries can constitute a complete street façade. To a street contains several consecutive block boundaries, how to use the RSD value more reasonably also is a question deserving discussion and exploration.

Acknowledgement

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References

Conzen, M.R.G. (1960) *Alnwick, Northumberland: a study in town-plan analysis* (Institute of British Geographers Publication, London).
Cooper, J. (2005) *'Assessing urban character: the use of fractal analysis of street edges',* Urban Morphology 9(2), 95-107.
Cooper, J., and Oskrochi, R. (2008). *'Fractal analysis of street vistas: a potential tool for assessing levels of visual variety in everyday street scenes'*, Environment and Planning B Planning and Design 35(2), 349-363.
Deng, Y. and Mao, Q. Z. (2003) *'Study on the formation and scale of block of Beijing inner city based on Qianlong map',* City Planning Review 27(11), 58-65.
Ding, W. W. and Tong, Z. Y. (2011) *'An approach for simulating the street spatial patterns'*, Building Simulation 4(4), 321-333.
Panerai, P., Castex, J. and Depaule, J. (2004) *Urban forms: the death and life of the urban block.* Architectural Press: Oxford.
Slater, T. R. (1987) *'Ideal and Reality in English Episcopal Medieval Town Planning',* Transactions of the Institute of British Geographers, New Series 12(2), 191-203.
Siksna, A. (1997) *'The effects of block size and form in North American and Australian city centres',* Urban Morphology 1, 19-33.

The crisis of the "common rationality" in the contemporary city

Nicola Marzot
Faculty of Architecture and the Built Environment, Technische Universiteit Delft, The Netherlands
Keywords: crisis, common rationality, universal rationality, spontaneous consciousness, critical consciousness

Abstract

Beyond a certain threshold, any crisis suddenly collapses from a temporary state into a permanent condition. While the former situation turns out to be physiological of every existing urban form development, the latter expresses a pathological situation affecting the city overall organic quality (Caniggia, Maffei, 1979). In fact, the crisis of the second kind identifies with an irreversible loss of "common rationality", which is evident in the civil reality as well as in its anthropic project. The crisis we have been witnessing over the last seven years on a worldwide scale belongs to this species. At such, it offers us the chance to think about the present condition, looking backward to the recent past experience, to reflect forwards on future possible perspectives. The paper assumes the current interval as the originating process of a stimulating new sensibility towards the architectural practice. At such, it identifies in the building vacancies and in the urban brownfields prompted by the crisis of the globalizing Network City a new generation potential of experimentation, mapping its consistency in the European context and offering a wide spectrum of the more interesting design initiatives in progress (Oswalt, 2013). The paper additionally aims at tracing back the dismissed building heritage unsuspected premises in the pre-modern age, taking the opportunity to deeply investigate the relation between spontaneous and critical consciousness. In conclusion, the two aspects seems to be more complementary to each other of what one could argue, playing a crucial role within any urban form transformation (Conzen, 1969).

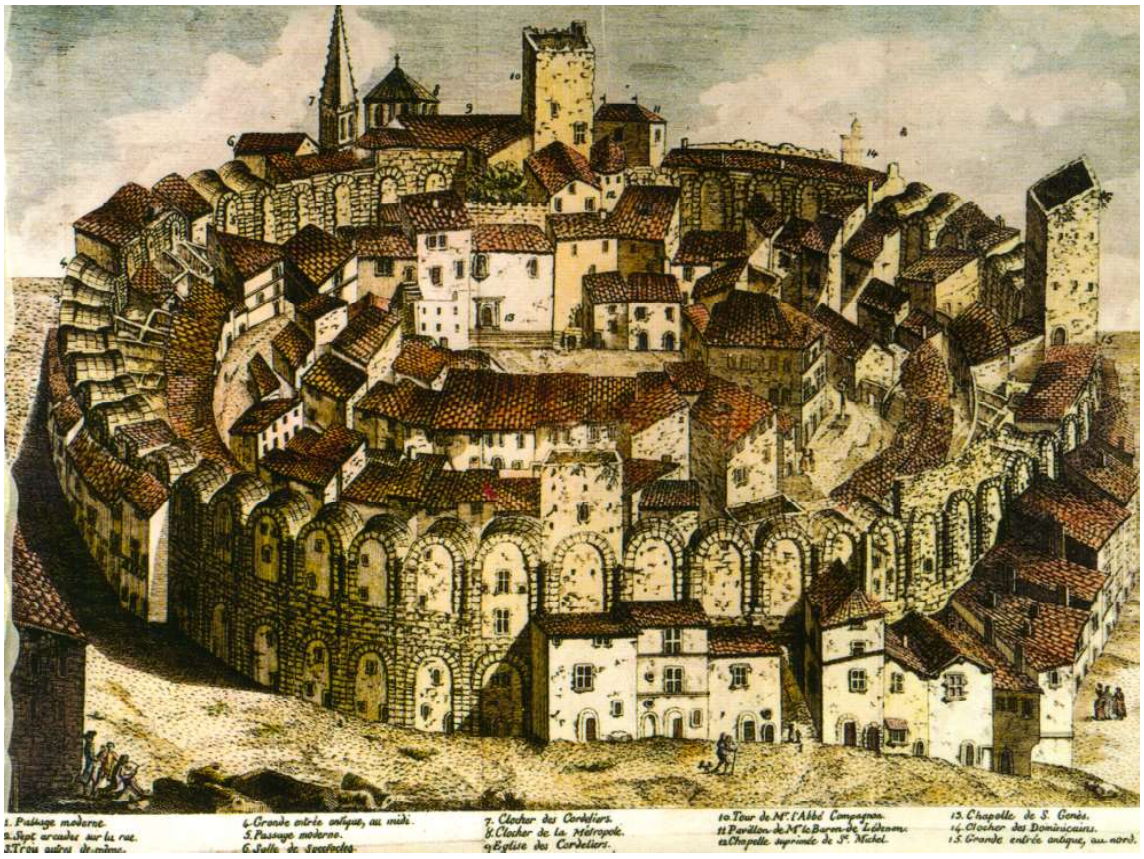
Introduction

In his pioneering book "Architecture and Utopia. Design and Capitalism Development", the young historian Manfredo Tafuri was pushing to its extreme consequences a challenging discussion, increasingly developed in Italy since the end of the '50, concerning the destiny of Architecture within the endless process of urban growth and transformation leaded by the western industrial capitalism driving forces (Tafuri, 1973). The main research question, harshly debated within the INU (National Institute of Urbanism) was about the possibility of a Rational Architecture in the light of the post Second World War overwhelming urbanization. It is fundamental just to remind how, at that time, the term "rational", was not any more univocally related to the interpretation offered by the Modern Movement epigones.

In that respect, the polemic reaction by Reyner Banham to the Bottega D'Erasmo, built in Turin by Roberto Gabetti and Aimaro d'Isola in 1953-56, which offered to its motivations unexpected but intentional worldwide audience and evidence (Banham, 1958), was explicitly witnessing a crucial shift in cultural perspective, bringing the Italian intellectuals far away from the still alive Anglophone orthodoxy.

The search for the "rationality" of architecture was on the contrary explicitly addressed to its unavoidable social-historical premises and long lasting legacy, solidly prompted by Giuseppe Pagano and Guarniero Daniel's pioneering work on the Italian rural building

Figure 1. *Arles' amphitheatre after the roman empire fall was progressively transformed into a self sufficient town. A building finally deprived of any conventional value, because of its driving force inexorable crisis, and thus reduced to inert matter, has been unconsciously metabolized by newly emerging dynamics to host the unexpected. Through a parasite methodology and an experimental process of selection and combination, the remain has been fragmented and rearranged, up to achieving a new material condition, ultimately leading to a conscious form. Because of this process, new subjects become aware of themselves by progressively claiming from their own present perspective what was inherited from the past to be projected in the future.*



tradition, published on occasion of the homonymous VI Milano Triennale exhibition (Pagano, Daniel, 1936). Additional conditions which facilitated the above mentioned debate where the distinctive role played by some protagonists of the scene. Giuseppe Samonà, publishing "L'urbanistica e l'avvenire della città" (Samonà, 1959) was emphasizing the necessity of bridging the disciplinary gap between Architecture and Urbanism, introducing the crucial issue of the "L'unità architettura-urbanistica". Saverio Muratori, leading since the mid of the '50 an unprecedented on field survey on Venice's historical centre, later on published in "Studi per una operante storia urbana di Venezia" (Muratori, 1960), was elucidating the contemporary crisis of architecture by witnessing its pre-Modern capacity of immediately structuring the city form, simply relying on its powerful conventional substance. Aldo Rossi, with "L'architettura della città" (Rossi, 1966), was superseding Kevin Lynch's fascination, very popular at that time among planners, for the use of perception and visibility, both of them considered instrumental to urban orienteering and design practice, fostering the importance of a structural evaluation of the city's form in search for a new role of Architecture within its formation and transformation processes. Ludovico Quaroni, writing "La torre di Babele" (Quaroni, 1967) was critically questioning the distinction between design and planning, increasingly widespread over the ongoing discussion on town development. Carlo Aymonino, coaching the research on "La città di Padova" (Aymonino, ed., 1970) was explicitly stressing the bifurcation occurred during the Enlightenment between the destiny of Architecture and that of Urban Design, additionally claiming the necessity to emend and recompose it during a period of crucial political revolutions. Additionally we should not underestimate the strategic function performed by the International Journal Casabella, directed by Ernesto Nathan Rogers in the period 1953-1965, in developing and widespreading the increasing awareness of the professionals to establish a direct relation between contemporary architecture and the existing inherited material conditions still resisting to the contemporary society and contradicting its values, expressed through the poetic reference to the "preesistenze ambientali". Moreover, it is not by chance that Manfredo Tafuri's milestone publication coincides with the fundamental exhibition "Architettura Razionale", curated by Aldo Rossi on occasion of the XV Milano Triennale. This event and the related catalogue (Bonfanti, Bonicalzi, Rossi, Scolari, Vitale, 1973) were symmetrically claiming a critical leading role similar to that addressed by "Architecture and Utopia. Design and Capitalism Development": to bring to a conclusion the discussion on the "rationality" of Architecture with regard to contemporary urban growth and transformation. To complete the background onto which these two positions should be compared, it is also important to remind that in 1959, the VII INU congress in Lecce was explicitly introducing the issue of the "Grande dimensione", i.e. the main concern about the increasing complexity and size of urban phenomena to be managed, which was progressively leading to consider the territory itself as the real podium into which the urban condition should have addressed its aspirations and projected its channeling energies. Not by chance, Tafuri was implicitly leading a series of important monographic issues on the "problemi della nuova dimensione", i.e. "questions concerning the new dimension", officially opened with the publication of "La città territorio" (Greco, ed. 1964). Both Rossi and Tafuri's diagnoses seems to converge about the loss of centrality and authority of Architecture under the Modern condition of industrial production applied to the construction of the city as such. The "rationality", or the capacity of guiding and embodying the civilization process of Modernity through a specifically structured and figured spatial strategy, notwithstanding the explicit pessimism on the subject already disclosed by George Simmel in an astonishingly brilliant essay (Simmel, 1918), it is nowadays under the control of the Plan, as its instrumental output, and the Planning, as its main burocratic-administrative-managerial activity, independently by the fact that those aspects are directly driven by the capitalistic force power or by the Welfare State, with the compliance of local political authorities, on behalf of the working classes. However, the prognoses are explicitly different. In fact, from 1973 onward Aldo Rossi, internationally launching the well known "Tendenza", will even more claim the necessity to reestablish the leading role of Architecture in the definition of the city form, aiming therefore to compete with the abstraction of the capitalistic "zoning" approach, while Manfredo Tafuri will argue the impossibility of contrasting the overwhelming "rationality",

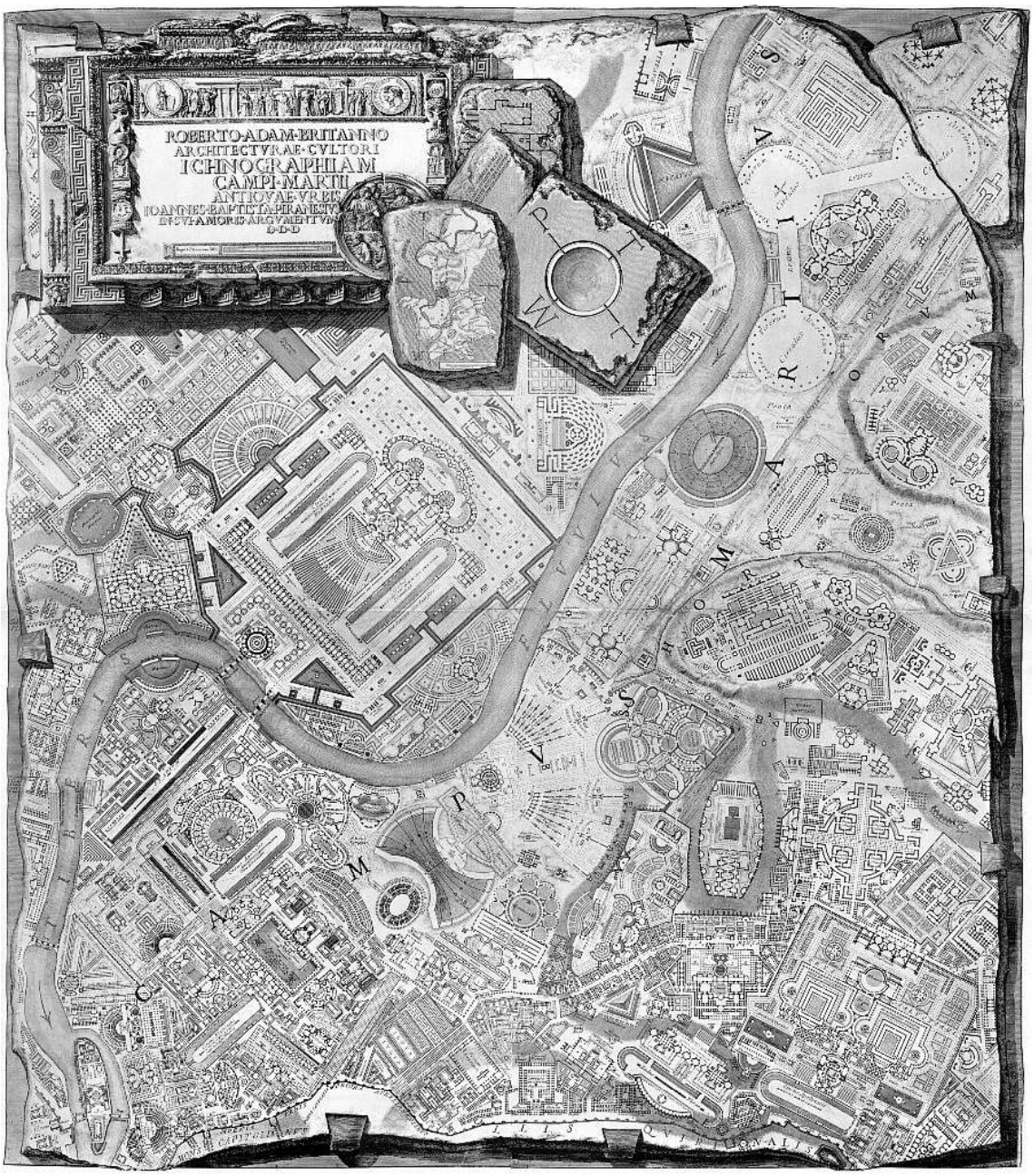
or "Gesellschaft", of the planning discipline prompted by Modernity. Nothing to say that, on an international perspective, the former will summatively initiate the road map further on taken by the discipline of Urban Morphology and Building Typology, independently from its specific interpretations, mostly addressed by individual protagonists and the related "schools", while the latter will confirm and legitimate the overwhelming supremacy of the planning activity, at least inaugurated since the stepping stone text by Ildefonso Cerdá "Teoria General de la Urbanizacion" (Cerdá, 1867).

Methodology

The purpose of this paper is to reevaluate the above mentioned hypotheses, to verify their possible actualization to elucidate the contemporary crisis of the city and cast a new light on its possible solutions. Since they are supported by different arguments, it becomes crucial to preliminary step back to their originating premises and further follow their immediate consequences at the level of both the theory and the practice of architecture, urban design and planning, with a special concern on the field of the typological studies. This aim also justifies why, in the due curse of the narrative, we will try to intersect and compare these arguments with those of other contributors to the discussion, some of them already mentioned. In the case of Aldo Rossi, precedents can be discovered in many important writings, but "L'architettura della città" (Rossi, 1966) displays in that direction a sheer insight. The reason is that the book represents Rossi's more tendentious work, i.e. that into which for the first time the author explicitly orients his previous and already mature understanding of the city's processes of formation and transformation for the sake of his own design practice and critical position in the framework of the international debate. For this reason it perfectly fits the aim of investigating the role and character of the architectural "rationality" in the production of the urban form.

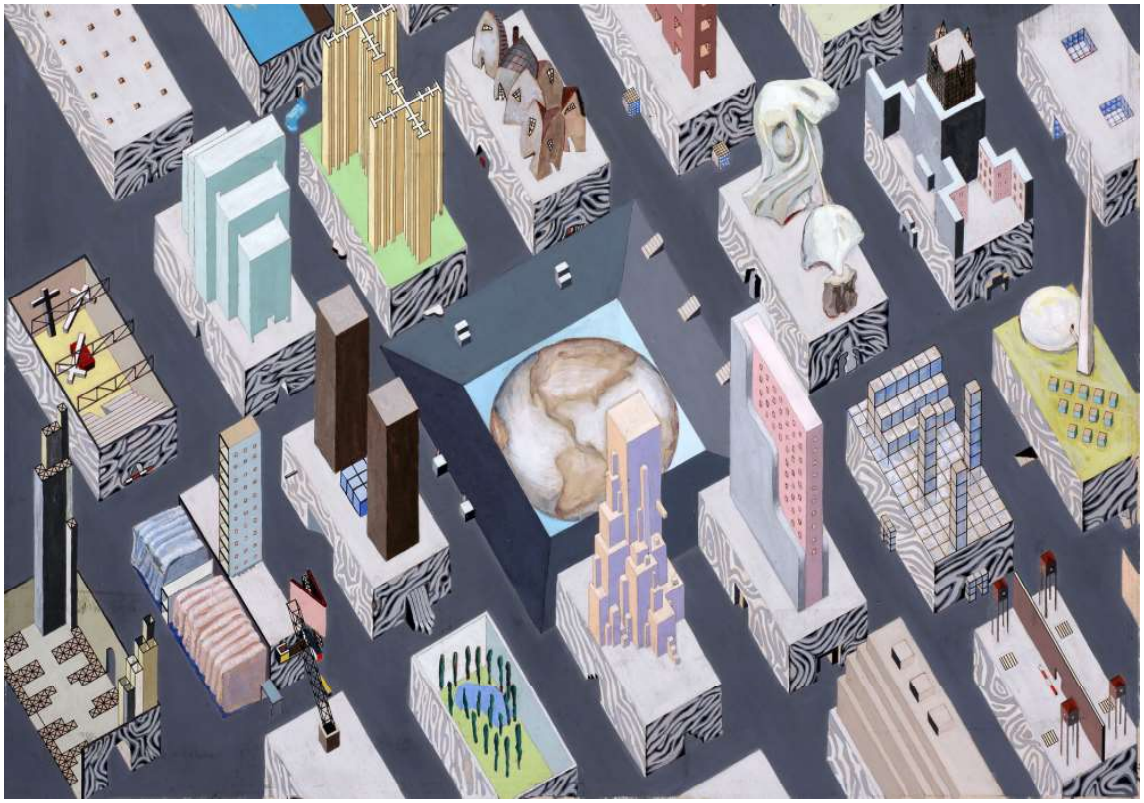
To achieve his main purpose, Rossi focuses on the concreteness of real urban facts, deeply analyzing their transformation due to the original program change. By comparing different case histories through space and time, from the origin of the city to the contemporary condition, he finds out explicit evidence of material facts which preserve almost intact their form notwithstanding a complete functional transformation. He names them "Elementi primari", in opposition to the "Aree residenza", which are progressively superseded by successive sequences of functional requirement changes, ultimately not being anymore recognizable in their initial state. While the former, according to the author, are responsible of the city changing form, the latter are not indeed, due to their endless modification. Rossi cannot clearly explain neither what does he means by "form", nor what really "resists" to the transformative process itself. In that respect, it becomes decisive the author's selection of built arguments in support of his position. They all derive from outstanding public buildings belonging to the roman antiquity legacy, like palaces (i.e. the Diocletian Palace in Split, translated into a city); amphitheatres (i.e. The Arles' one, become a small city as well); circuses (i.e. the Rome Hippodrome, transformed into an outstanding baroque plaza), which have been progressively metabolized by preserving a certain kind of permanence. Is therefore this permanence to be inductively questioned to deduct Rossi's position about the "rationality" of Architecture and its ability to guide urban growth. Disregarding any concern about the shifting "role" of the selected built manifestations, whether or not they are private or public, and independently from their appearance and possible diffusion in the successive development of the city, he implicitly identifies the indexicality of the permanence with the "logical configuration" of the built facts. Not assuming the intentionality and the meaningfulness of the transformation itself as a relevant factor to judge in order to understand urban form transformation, he deprives the architectural form of the possibility to embody an explicit political will manifested by specific driving forces. By immediately, i.e without any reflection on the conventional assessment which any change implies, identifying "rational" with "logical" and "timeless", Rossi implicitly pays his respectful homage to the Enlightenment legacy. So doing, he mismatch the Type with the Archetype, confirming all the aporias later on attributed by Manfredo Tafuri to the XVIII century Rationalism. It is wise to notice that,

Figure 2. In the "Campo Marzio dell'Antica Roma", Giovan Battista Piranesi pushes to its extreme a fictional process of fragmentation of the Roman legacy, transforming the field into a congested "landscape of ruins". In such a way, what was initially real originates a virtual condition potentially supporting new experimental approaches. Architecture, reduced to particles suspended into a limitless time, awaits for a possible claim



working on similar arguments, Saverio Muratori (Muratori, 1960) and his pupil Gianfranco Caniggia (Caniggia, Maffei 1978) were attributing to comparable processes of transformation a completely different significance. Deeply investigating the resulting outputs, they discovered through their material quality analysis the seminal origin of newly came into being conventional ways of building and inhabiting, thus revealing in the transformative process itself of preexisting buildings the implicit search for a new state of conventionality. To clearly distinguish and explain the originating process of urban artifact's metabolization from its explicit output successive application into well optimized solutions, they developed the definition of "coscienza spontanea" opposed to that of "coscienza

Figure 3. The American city Grid, being disconnected from its architecture, consciously establishes the divorce between the political/institutional level, of which the former represents the empty rhetoric symbol, and the social-economical one, preventing the possibility that its unpredictable dynamics can affect and change the value upon which a liberal society is supposedly grounded. This sheer distinction is contradicting the value of Democracy, which is based, since its origin, on the inviolable assumption of the individual autonomy in defining its limits and jurisdiction. Rem Koolhaas and Madelone Vriesendorp seem to be aware of this paradox in "The city of the Captive Globe" (1976) representing New York as a museum of ideas on the city transformed into collectable sculptural ideologies eradicated from their own originating conditions



critica". This fundamental achievement is still nowadays capable of discriminating the genuine creativity expressed by the recycle of existing buildings from the possibility of applying its results onto brand new conditions. Not achieving the same precision in term of knowledge, also Antonio Monestiroli was stressing in "L'architettura della realtà" (Monestiroli, 1999) the political implications embodied by the process of transformation as the stubborn principle upon which the latter's intentionality is grounded, downgrading Rossi's emphasis on the inner logic of architecture as a secondary aspect.

As we have already anticipated, Manfredo Tafuri identifies in the Enlightenment period the paradigmatic shift from ideas to ideologies, denouncing how the latter derived from a misinterpretation of the social-historical conditions affecting the former, clearly eradicated by the specific limits which make them meaningful and necessary for the corresponding process of civilization. Therefore, the ideological use of "rationality" during the XVIII century becomes instrumental to a political will of superseding the Ancient Regime's set of values, also preventing that others could assume a similar position against the raise of the bourgeois society, by simply arguing about the supposed "universality" and "absoluteness" of the human rationality and bringing it as the unprecedented grounding principle of its architectural and urban practice, implicitly criticizing Rossi's position. To support his hypothesis, the roman historian brings as his main arguments the leading position of the Abbé Marc Antoine Laugier and of Giovan Battista Piranesi. The former, by emphasizing the role of the picturesque in urban design, states its becoming a pure rhetorical and spectacular exercise,

deprived of any historical rationality (Laugier, 1753) as well as the latter does by endlessly multiplying the inert and spoiled traces supposedly inherited from the Roman antiquity in his fictional "Campo Marzio dell'Antica Roma" in 1762, producing an overwhelming entropy of architectural fragments whose phantasmagoria effectively forecasts the disappearing role of Architecture and its inutility in the definition of the form of the city. Manfredo Tafuri originally attributes to the American City, prompted both by Thomas Jefferson's architectural Palladianism and Pierre L'Enfant's subtle combination of colonial and neobaroque planning, the merit of attributing a physical evidence to the absolute rationality brought to the fore by the Enlightenment. Within the almost metaphysical permanence of the American Grid, which expresses the unavoidable principles and not negotiable values upon which its democracy claims to be grounded, the architecture, once deprived of any possible rational power, but simply reduced to its inner logic principles, can endlessly change according to the needs of the unpredictable appearance of new economic driving forces. In such a way, the individual freedom can acts without compromising the timeless quality of the liberal institutions into which it is framed since its beginning. The impossibility of its subversion is therefore inscribed in the unprecedented sheer distinction between the political/institutional level, embodied by the stable Grid, and the social/economical one, expressed by the interchangeable architecture. According to the author, the planning strategy adopted by the Modern Movement, through the promotion of the CIAM, inherits what remains about rationality after the divorce from architecture and becomes a new overwhelming Totality, responsible of any urban proposal, from the New Town program to the Villes Nouvelles one. This position will be further developed by the AUA, the roman group of urban planners of which Tafuri was an active partner. Nothing to say that from these experiences will stem for complementary reasons both the participatory processes developed by Giancarlo De Carlo- in the fragile attempt to partially intercept a raising demand of political recognition, beyond the uniform and anonymous representation of it offered by the functional rationality- and the still well established technocratic power of the administrative bureaucracy, which progressively will take the command of the territorial transformation with its normative apparatus, replacing the loss of a real political presence, superseding any possible autonomous legislation once imposed, and not heteronomously suffered, by architecture. The most controversial result of this new condition is what has been posthumously called Post-Modernity, at least since the first International Venice Biennale of Architecture hold in 1980 and directed by Paolo Portoghesi. It is also important to remind that Tafuri's intuitions about the origin of the American city and the role it played for the increasing development of the rationality of the Plan, representing a Democracy reduced to a pure "sign", have heavily fertilized the entire intellectual disciplinary discussion in the USA from the 70' onward, founding at Columbia University in NY their truly international platform, as the international Journal Opposition witnesses in the period 1973-1984 and the book "X-Urbanism: Architecture and the American City" by Mario Gandelsonas (Gandelsonas, 1999) finally summarize. In that direction, the latter can be considered as the American counterpart on the idea of the city as a project, complementary to Aldo Rossi European vision of it.

Forming process

After having elucidated the historical process through which the relative rationality of Architecture has been progressively weakened in favor of the Plan's absolute rationality, to which solely the territorial administration has been explicitly advocated; once recognized that the origin of that unprecedented distinction, instrumental to the bourgeois society capitalism, can be traced back to the Enlightenment and its explicit struggle with the Ancient Regime's set of values; verified that the Modern Movement has further developed the power of the Plan up to its ultimate possibilities, giving to it the stubborn capacity to overcome any claim of civil transformation by endlessly preserving its integrity, it becomes interesting to understand to what extent it is still possible to apply the principle, the categories and the catalogue extracted from the above mentioned arguments, and their reciprocal interplay, to understand and to deal with contemporary problems.

Applying Aldo Rossi's arguments to the Plan analysis, and not to the Urban Facts as he does, we arrive at the surprising conclusion that the Plan itself, at least since its modern inception and deployment occurred during the XX century, witnesses its endless capacity to resist to any kind of functional change by preserving its rational consistency, establishing an analogical relation to what the Italian architect defines as an "Elemento primario". Therefore the absolute universality of the Plan acts at a logical level, as the archetypes do. As a natural aspect, it is inherent to all social-historical facts, but does not identify with none of them. This brings to the paradoxical conclusion that the distinction between Design and Planning, which is recurrent since the bourgeois society appearance onward, where the former is programmatically subject to change while the latter lasts endlessly, now appears deviously instrumental to prevent the Plan's capacity to embody any process of civilization in both space and time and any claim of political expression in and through the project of the city. In addition, being the Plan strategy applied to the entire territorial scale, it becomes in such a way the unique responsible of the city form, taking over architecture in that respect. Therefore the divorce promoted by Modernity between the Architecture and the Plan corresponds to that between a "Common rationality" and a "Universal rationality". While the former is specifically developed by the agents of transformation, and hence it is highly political being under their complete historical responsibility, the latter belongs unconsciously to all individual, not being pertinent to the definition of their specific character. By emphasizing the overwhelming role of the universal rationality we have been progressively reduced the importance of the social-historical one, made possible by the rationality of architecture as the conscious product of a specific demand of civilization. In addition, since the universal rationality is never dismissed, overcoming any time periodization, while the common rationality is systematically put into discussion every time its leading forces are superseded by others claiming the same role, the shift in power and control of the territorial transformation,

Figure 4. A post-industrial vacant building, beyond a certain time lapse, exceeds the expectations of the existing society and offers itself for new experimental community. This condition implies to sacrifice the set of rules supporting the values embodied by the related Plan, belonging to the past. If the Plan consciously resists to it, deprives the expected community of any possibility to come into being, paradoxically assuming the political significance of a "negative thought", betraying its supposed neutrality and absoluteness. The Plan looses its innocence because of the architecture's struggle to claim a new role on behalf of unprecedented emerging subjects

from the architecture to the plan, inevitably leads to declare the "dead of history", or the impossibility to subvert the political/institutional power, now inscribed within the Plan, by the social-economical power, embodied by the Architecture.

At a more general level the above mentioned conclusions justify almost all the aporias encountered by the discussion we mentioned at the beginning of this paper. The existence of a universal rationality, naturally generated, does not justify and explain the existence of any process of civilization, which is always social-historical, or conventionally determined. In that perspective, the Enlightenment introduces an exception without precedents: to transform the former into the latter, not assuming explicitly the responsibility of having determined a crisis within a preexisting system of values, but on the contrary simply claiming to have restored the role of the necessity to exit the former period, considered in itself a persistent period of crisis. To deeply understand what happened since that period onward, we cannot therefore underestimate that we had been progressively witnessing an enduring "State of exception" with minor standstills, paraphrasing Giorgio Agamben's internationally known political essay (Agamben, 1998). The smooth transit from Modernity to Post-Modernity, in this respect, has been a successful rhetorical exercise since the Plan, governing the territorial transformation during the previous period still continue to manage it during the current one without any solution of continuity. Similarly, any methodology relying on morphological and typological devices not taking into account the reciprocal antagonism between the architecture and the Plan, inevitably reduces itself to a pure rhetorical exercise as well. In that respect, Manfredo Tafuri is right supporting the idea that, from the Enlightenment onward, any conscious architectural proposal should carry an utopist vision against the Plan, whose rationality is inevitably ideological since it is not justified by the conventional and limited aspiration of the historical moment promoting it.

At a more specific level this bring to conclude that it is not acceptable at all that the universal rationality of the plan can limit the unlimited capacity of the common rationality of the design but, on the contrary, we urgently need to reestablish the former instrumental use of the latter, which should be simply available with this purpose. This is possible solely by experimenting forms of architecture that systematically waive the Plan's set of rules, taking the total control of the territorial transformation. Paradoxically, the contemporary crisis can contribute to that liberation. In fact the crisis is making the Plan ineffectual and useless since it is originally conceived to run the city growth and not its shrink.

Conclusion

To ride over the contemporary crisis, which is implicitly originated by the Plan's capacity to survive any possible functional transformation without losing its integrity and affected by the Plan's inability to host the unexpected, the contradictory, the experimental and the organic, it becomes an unavoidable priority to reestablish the primate of the "common rationality" of the design theory and practice, which is always social-historical, above the overwhelming claim of the Plan's "universal rationality", which is always natural, to systematically supersede it. This paradox implies to eschew the Plan itself, and its absolute set of values. Over the last decades we had already been witnessing a successful attempt to achieve that goal. It was originally predicted by Rem Koolhaas in "Delirious New York" (Koolhaas, 1978), and later on prompted by the same author in "Bigness, or the problem of Large" (Koolhaas, 1995). The former study is the result of an inspiring urban analysis essay through which the Dutch architect retrospectively describes the struggle of an uncontrollable architectural experimentation, whose originally involuntarily progress will subvert the Plan rationality- embodied by the American grid, conceived to be inviolable- finally achieved by gradually transforming the urban block into a vertical city. The latter expresses the attempt to translate an unconscious phenomenon, existing de facto, i.e. the "Manhattanism", into a conscious technique, imposed de jure by the architectural rationality itself. This has been partially possible because of a new kind of driving forces, belonging to the global capitalism, acting on an unprecedented worldwide perspective, capable of superseding any absolute rationality captured by the Plan. In the current situation this seems not affordable anymore, due to the economical-financial re-

strains nowadays affecting the above mentioned energies, weakening them. However, a similar result can be achieved by suddenly reversing the perspective and progressively reclaiming the "landscape of ruins" inherited from the collapse of the previous world. In fact, the same global capitalism forces were nurturing themselves by sacrificing already existing relicts of the post-industrial era, which offered strategic locations within the city, highly accessible in term of infrastructural intermodal connectivity, to multiply the possible revenues derivable from the new capitalism's impressive financial investments. Today these areas are still available for different purposes, potentially leaving space to new subjects emerging from the crisis. They are searching for experimentation, since they do need to achieve a sheer consciousness of their own increasing personality. However, the Plan is resisting to them, acting as if the subjects belonging to the old world were still alive, which is not indeed the case. Taking advantage from a "counterattack" strategy, and from the time lapse needed to be aware of it, a new condition of Plan's vacancy appears into which the unexpected can flourish beyond any rationality, demolishing its own premises and promoting new research questions. This brings to hypothesize that the conventional, or the "common rationality" always originates from the unconventional, or the "absolute rationality", and the unconventional derives from the superseding of a precedent state of conventionality, leading the study of urban form to new challenging frontiers (Marzot, 2014).

References

Agamben, G. (2005) *Stato di eccezione* (Bollati Boringhieri, Torino).
Aymonino, C. (ed.) (1970) *La città di Padova* (Officina Edizioni, Roma).
Banham, R. (1958) *'Neoliberty: The Italian Retreat from Modern Architecture'*, The Architectural Review 742, 231-235.
Bonfanti, E. and Bonicalzi, R. and Rossi, A. and Scolari, M. and Vitale, D. (1973) *Architettura Razionale* (Franco Angeli Editore, Milano).
Caniggia, G and Maffei, G.L. (1979) *Composizione architettonica e tipologia edilizia 1.Lettura dell'edilizia di base* (Marsilio, Venezia).
Cerdá, I. (1867) *Teoría general de la urbanización y aplicación de sus principios y doctrinas a la reforma y ensanche de Barcelona* (Imprenta Española, Madrid).
Gandelsonas, M. (1999) *X-Urbanism: Architecture and the American City* (Princeton Architectural Press, Princeton).
Greco, S. (ed.) (1964) *La città territorio* (Leonardo da Vinci Editrice, Bari).
Koolhaas, R. (1978) *Delirious New York: a Retroactive Manifesto for Manhattan* (The Monacelli Press, New York).
Koolhaas, R. (1994) *'Bigness or the problem of Large,* in OMA and Koolhaas, R. and Mau, B. (1995) *S, M, L, XL* (010 Publishers, Rotterdam) 494-517.
Laugier, M.A. (1753) *Essai sur l'architecture* (Duchesne, Paris).
Marzot, N. (2014) *'Beyond the typological discourse. The creation of the architectural language and the type as a project in the western modern city',* unpublished PhD thesis, Technische Universiteit Delft, The Netherlands.
Muratori, S. (1960) *Studi per una operante storia urbana di Venezia* (Istituto Poligrafico dello Stato, Roma).
Monestiroli, A. (1999) *L'architettura della realtà* (Clup, Milano).
Pagano, G. and Daniel, G. (1936) *Architettura Rurale Italiana* (Hoepli, Milano).
Quaroni, L. (1967) *La torre di Babele* (Marsilio, Padova).
Rossi, A. (1966) *L'architettura della città* (Marsilio, Padova).
Samonà, G. (1959) **L'urbanistica e l'avvenire della città** (Laterza, Bari).
Simmel, G. (1918) *Der Konflikt der modernen Kultur* (Duncker &Humblot , München und Leipzig).
Tafuri, M. (1973) *Progetto e Utopia* (Laterza , Bari), English translation
Tafuri, M. (1976) *Architecture and Utopia. Design and Capitalism Development* (The MIT Press , Cambridge).

The urban event. The city as a complex system far from equilibrium

Sara M. Boccolini
Universidad Nacional de Córdoba (SECyT) - Bauhaus research School, Bauhaus Universität -Weimar
Keywords: urban planning, complex systems, new urbanism, open planning

Abstract

This research explores the methodological, instrumental and conceptual possibilities of the systemic approach developed in quantum physics and mathematics: urban centers are complex systems that function as nodes articulating human activities networks in the territory, in a dialectical relationship that evolves over time. Where traditional urbanism sees fragmentation, incoherence and chaos, this approach sees organized complexity as the true nature of urban form and meaning.

The mechanistic and reductionist view has dominated since the beginning of urbanism as discipline, accompanying the determinist approach that dominated science for centuries. Currently urban studies and urban planning seem to have reached an impasse, even accepting the tendency of cities into chaos as an inevitable process, or proclaiming the death of cities we knew them. However, overtime, cities have grown and configured themselves as the centers of power, innovation and development; they articulate the cultural, economic and political development of societies worldwide.

This article allows reading existing cities in the light of a new approach. It combines the complex systems framework with urban trends such as the strategic lines raised by UN-Habitat. The urban condition is explored through its dynamic, complex, self-organizing nature, and the intensity of exchanges -synoecism- that define it. Therefore, diversity, exchanges and meetings between extrangers are crucial. The city is a system open to the territory, where top/down and bottom/up processes occur simultaneously; the development of these processes over time produces a complex dialectic relationship, whose understanding is key to developing an efficient and sustainable urban environment.

Introduction

Cities have been associated historically with a higher quality of life, opportunities for development and progress. Within urban systems humanity has its most important fruits; it have developed there technological advances, cultural changes, revolutions, and, why not, the social and spatial models that have meant his own destruction.

But while there is consensus on the key role of cities in history, this is not true in regard to the definition of the urban condition or how to optimize urban processes to ensure a more efficient and sustainable development. It seems that planners give up shortly after start. Frustration is obvious when the studies to understand and diagnose the city -and the planning tools derived from them- produce collateral damages and even increase the negative factors that should be reduced or eliminated. Despite all the effort and resources invested, the gap between the planned city and the built city increases more and more. Urban conflicts seem to stay one step ahead of the proposed plans to solve them. The pace of events is beyond our ability to assimilate them, and plans lose their effectiveness and relevance, looking futile any attempt to management.

To overcome this contingency, and looking forward to the Habitat III summit, the United Nations convene a scenario where it is crucial to define specific strategies to operate in cities. The central idea is a renewed commitment to urban centers, defining strategies aimed at achieving greater inclusiveness and accessibility. The need to provide access to housing, basic services and public spaces safe for all arises; the city need to be energy efficient, resilient to climate change, promoting public and environmental health; widen

Figure 1. New York City slum photographs of Jacob Riis (ca 1890) Bandits' Roost

participation to all citizens, with policies made by and for the people living in them (UN-Habitat, 2013)

But because the love-hate history and the constant frustration we have with cities, Is it worth renewing this commitment? Best efforts, the economic and political investment involving this new planning structures, Are they justified only by the `good will'? Is it going to stop the downward spiral of failed experiences and waste of both economical and social resources?

This article aims to guide the analysis of these issues under a new hypothesis: The strategic lines raised toward Habitat III are not a matter of good intentions, not even of greater justice or fair redistribution of urban benefits. They mean a change in understanding the way a city works and develops trough time. And beyond the obvious social and environmental benefits to be achieved, its implementation reflects the most rational logic of sustainable development, which will also promote economic and political benefits.

First, a new approach is proposed to study the urban condition: The city is a complex event, and the approaches to meet, explain and intervene in it should be equally complex.

Second, the variables that determine the sustainability and efficiency of a complex urban system will be explained. This will establish the feasibility and effectiveness of proposed policies not only by UN-Habitat, but by many others, doubling the bet for the future of our cities.

The city was never a machine

The origins of modern urban planning are in the process of rapid urbanization that occurred in Europe since the mid-nineteenth century. Urban congestion was cited as the cause of all problems; It was aimed to physically control growth and prevent overcrowding, while decreasing the incubation of social unrest, and establishing new spatial land use standards.

In order to define this policies, the conceptual advances originated during the industrialization played an important role: The city suposed to be a great machine, consisting of elementary components, with a simple and precise geometric order. Its performance could be deduced by studying its basic constituents and discovering the mechanisms that put it into operation. The city was a system that worked according to criteria established a priori from the outside; that mode of operation left no room for `informalism' or chance.

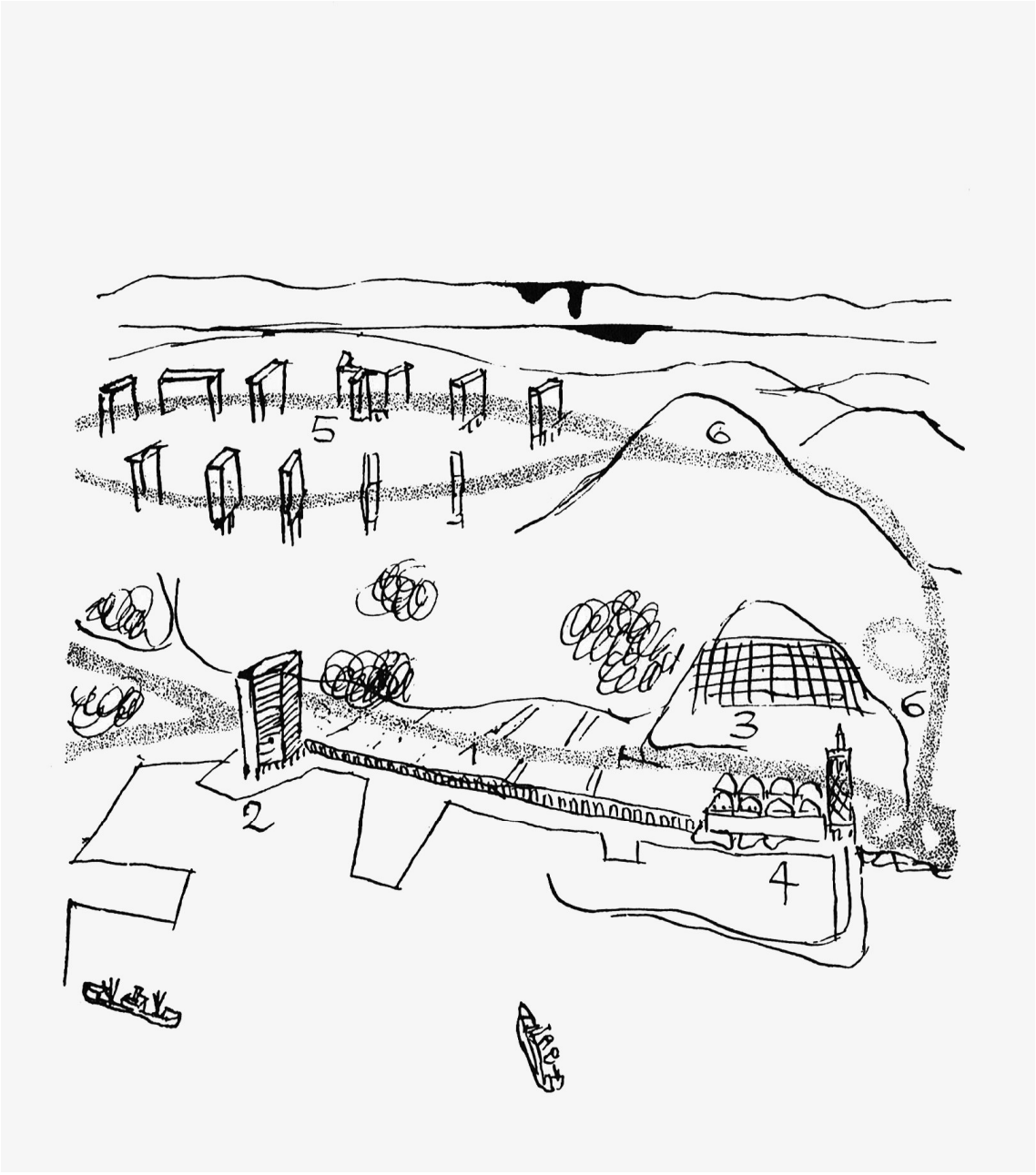
Urbanism was forged in this partial and reductionist view: sociologists, geographers, architects, planners, and economists operate from their particular conceptual worlds. They dedicate only to develop aspects of the urban problem related to their specialty. Jane Jacobs (1961:155) compares this approach with a Sufi story of several blind men who touched an elephant and then pool their findings to understand how it is. The shortcomings of this model have become increasingly evident, both for its simplistic conception of cause and effect between physical environment and social behavior, and the lack of preparation for any modification of the context, with the exception of those promoted by the plan.

But how do you separate the social dimension from the cultural, economic, political, or spatial ones? The motivations and impulses of actors are the results of the interaction between them. A decision in the economic sphere will have social and political roots; a social decision will be defined by political and economic, family or work reasons; the physical and natural environment in turn will influence these decisions, and they will be modified simultaneously by them. These fields can no longer be considered separately: actors do not operate in a sigle-dimension way.

Emerging trends in contemporary urban planning pose a break with the hegemonic conceptual and operational lines: they understand the dynamic, complex and interdependent nature of urban centers, raising Iterative interventions with the urban system in a continuos and flexible way; analysis with an approach that understands the city as a complex system, a node that is both a set of internal processes and part of a larger network of human activities on the territory.

Planners are now more circumspect regarding their ability to predict and control events

Figure 2. Le Corbusier´s project for the city of Algiers (1946)
The drawing shows "a plan wich finds a way to ensure the superb existing line: location, classification, distance, architectural splendor." 1. Civic Center; 2. The city of business; 3. Extension of the Casbah; 4. "Native" institutions; 5. Housing "where they should be taken"; 6. The road network links the different parts



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in the urban system, and more aware of the social, economic and environmental consequences of their decisions. The uncertainty of the urban development involves a constant process of monitoring, learning and adjustment to the objectives and intervention tools.

Concepts such as the common good is no longer taken for granted, but working legitimizing and providing transparency to the processes of intervention, while governance stakeholders are encouraged. The inclusion now means also integrate the multiplicity of interests, abilities and objectives of the actors involved in urban development.

The city as a complex system

The complexity of the city as a system has been proposed as interpretative and instrumental framework from geography (David Harvey, 1973), sociology (Niklas Luhmann, 1995), biology (Salvador Rueda, 2014), and urbanism (Jane Jacobs, 1961, 1969; Nikos Salingaros, 2005, Edward Soja, 2000; Michael Batty, 2013). A system is a set of elements that is greater than the sum of its parts: it operates in terms of connectivity/accessibility, relationships/exchanges/synergy and context, so the properties of the parts can only be understood in relation to the whole. The elements of a system can be very simple, but the density within the interactions makes more complex patterns and processes emerge gradually.

An urban system is the result of an addition of components (actors) spatially localized and rooted in a given territory, managing resources at their disposal according to social, political, and economic structures, and seeking to resolve or meet certain demands or interests, forming an agglomeration within a broader territorial and social context.

In conceptualizing the city as a complex system, an alternative view of the logic of production and development of the urban condition arises. It understands the simultaneity of the interrelationship between social and spatial, economic, political dimensions to define urban processes, and the diversity of actors, resources and trade flows. It evidences the multi-scalarity of these interrelations, in which micro-scale phenomena have an impact on the macro scale triggered phenomena, and vice versa. The dynamic condition that derives from this interaction between components, not only internally but also with the environment, generates a dialectical process of adaptation that evolves over time (Lefebvre, 1975; Soja, 2000), that definitively distances urban systems from deterministic systems such as machines.

Cities are nodes in the network of human activities on the territory

The urban event was defined as open-to-the-territory but autonomous system: The context only triggers structural changes, it does not specifie or direct them. The system develops between this integrative trend that conditions it as part of a larger network, and the self-assertive tendency to preserve its individual autonomy; its continuing structural changes in response to the environment define the dynamic and immanent logic of urban development.

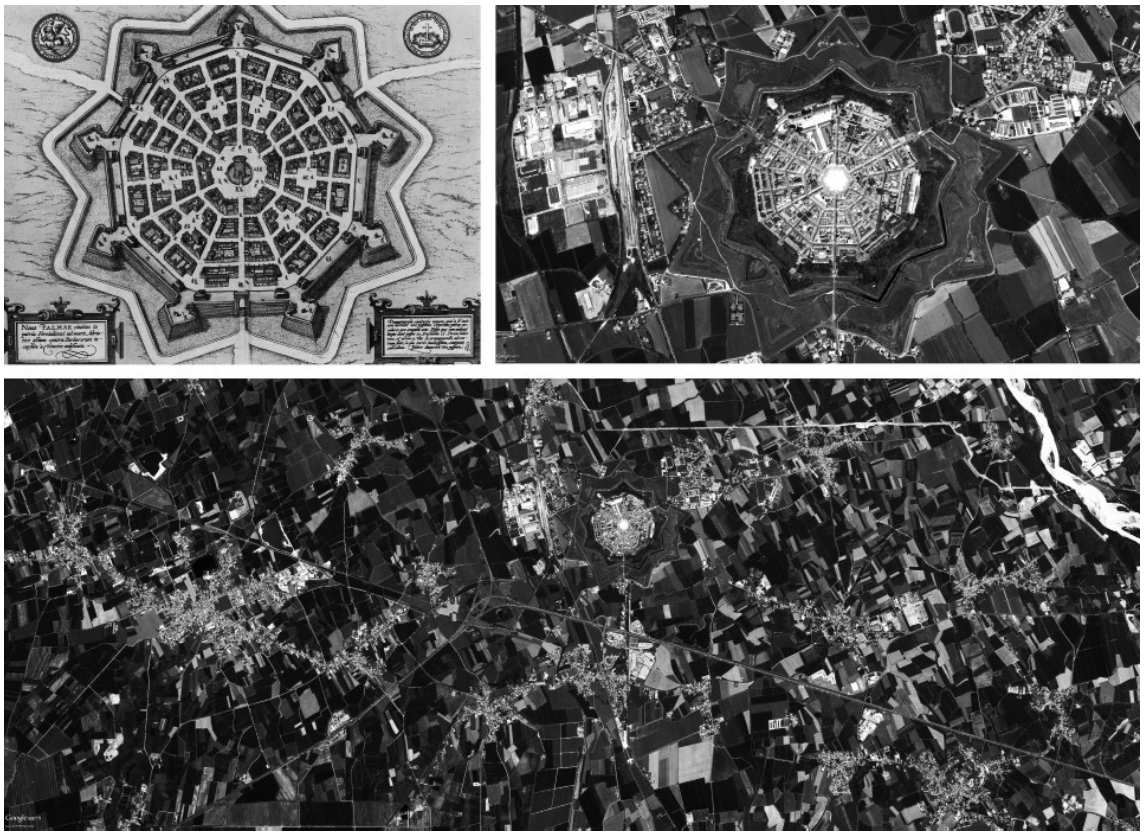
This evolution and adaptation extends to the context, as it is also made up of a network of systems of varying complexity able to react to changes. Thus, concepts like Darwinian adaptation are being neglected in favor of co-evolution and co-adaptation, in a dialectical process that develops through the subtle interplay between competition and cooperation, creation and mutual adaptation.

The eternal difference between rural and urban arises futile, and urbanity is defined as the condensation of human activities in a given space, part of a wider network of relationships. What are commonly called cities are just nodes in the complex web of human activities on a global scale. This network generates agglomerations of functions and population of various kinds, articulated with the environment and with other nodes: a city is not only a focal point of its rural hinterland; its development is mainly driven by trade relations established with other urban centers in the territorial network. Conceptions such as urban edges, archipelagoes, metropolitan areas, conurbations are simplified, understanding the territorial-cultural system as a articulated whole.

The city processes external elements (resources, population information) allowing lower its levels of entropy[1] and develop some level of internal organization. A system does not simply `import' order from its environment, but it absorbs energy-rich material and integrates it into its own structure, processing it according to its internal organization. Both

[1]Complex systems tend to entropy -the most likely state, and in which you need a level of zero or near-zero energy to maintain it- which means evolving from order to disorder. However, non-isolated systems can reduce the tendency toward entropy -what we call chaos- constantly introducing information and external energy to the system.

Figure 3. The city of Palmanuova, Udine, Italy.
Palmanova is a town and comune in northeastern Italy (Friuli-Venezia Giulia), example of `star forts´ of the Late Renaissance, built up by the Venetians in 1593.
Upper left: Map of the original project of the city, according to the humanists theorists of an ideal self-sustaining city.
Upper right: The city today (2015), surrounded by urban equipment and housing setlements built up over time to adapt the urban structure.
Bottom: The city of Palmanuova, within its metropolitan network: Clockwise, from the middle-left: the city of Gonars; San Pedro (with the main train station), Mereto di Capitolio, Sottoselva (with the stadium, technical schools, hospitals, military facilities), Jalmicco, Seveliano (shopping centers) From left to right, the highway to Venice and Eastern Europe. From top to bottom, the highway to Udine and Northern Europe. In between urban nodes, smaller agglomerations and rural hinterland and its facilities



goods, energy, actors, and information are constantly exchanged (necessarily) with the context. This creates feedback loops, nonlinear dynamic development processes that determine the behavior of the urban system over time, in a much more complex way than a determinist system.

Feedback loops allow the reaction of the elements of the system to the conditions set internally or by the context and regulate its development. It is this logic that allows cities, according to their circumstances, simultaneously generate homeostasis processes that determine the resilience of the urban system[2] and learning, adaptation and evolution processes[3].

The mechanisms by which an open complex system -like a city- can simultaneously

[2]In homeostasis processes, compared to a fluctuation, the system tends to maintain its initial equilibrium condition by negative feedback mechanisms that reduce the system deviation.

[3]Evolution whitin a system´s organization occurs where the fluctuations are so strong that push the system through a situation of instability to a new structure and relatively stable to this situation.

process information and trigger internal and dialectical synergies with the context, either retaining their original state or adapting itself to the new situation, they depend directly on the quantity and quality of the interrelationships of the system. As these processes are more numerous and diverse, the system will increase its ability to interact with the environment and organize itself internally. This explains the hyper stability developed by complex systems, such as cities and social structures, that can withstand very intense changes -both qualitative and quantitative-, and yet retain the organizational structure that characterizes them. This condition confronts cities with the deterministic structures, that are unable to explain the mechanisms of resilience, adaptation and evolution linear systems.

The city is a pattern over time

A city can be recognized despite daily change the elements that make up: some of its inhabitants emigrate, others die; newcomers come to inhabit and others are born. Industries, businesses and traders settled there, develop and go bankrupt or transfer all or part to other cities. His nature is unstable, continually leading to processes of change, crisis and adaptation. However, we can recognize the same city at all stages; even when it is fully moved to another location due to natural disasters or infrastructure projects, epidemics or wars. The key to this is that we intuitively understand cities as a complex structure that is stable far from equilibrium, while retaining individual development patterns.

Unclosed complex systems, which retain an internal structure that defines them, despite the constant changes in the elements that compose them over time, were referred to as dissipative structures by Ilia Prigogine (1994a). Its internal structure can only be explained as a non-linear process.

This self-organization is closely linked to the resilience and adaptability given by the interconnections and feedback loops when the system is far from equilibrium. However, the same logic of development can be found in any human settlement throughout history and in every corner of the planet. What determines the `urbanity' of a settlement?

Towards a definition of the urban condition

In urban nodes, activities no longer focus on the exploitation of natural resources but derived from these activities, such as management and exchange. However, nodes which bind non-rural functions also include towns, villages, antique markets in crossroads, industrial complexes, and so on. To achieve the urban condition, an agglomeration must also have other features. What characterizes these activities we call nodes cities?

Many authors define the urban condition from the social, cultural, political, economic dimensions, and, of course, from the physical-space. However, urban centers seem to escape these definitions.

According to the bourgeois market-town of Weber (1986) what do the new towns produced by the sui generis socialist regime in China and cities in the former Soviet Union have to offer?

The functional qualification criteria also lose relevance. There are market, port, industrial, government, religious, educational, and military towns.

What do the Friedrich Engels´ industrial Manchester, Robert Park´s Chicago, and Lucio Costa´s institutional Brasilia share?

Is equal the minimum number of a population to be considered urban in Argentina, United States, South Africa? And while we talk about numbers, is there a maximum number of people for a city can function without collapsing and lead to entropy? The 5,000 citizens of Plato, 30,000 of Howard's Garden City, the 50,000 of the British New Towns[4] or 10,000,000 of the new city of Shenzen in China?

Even if we define urbanity by population density, alternatives are uneven, from the densities of Tokyo/Yokohama (11400 inhabitants/km²) to densities of Paris (1098 inhabitants/km²) (Demographia, 2014), to the suburban developments in the US: How can we

[4]Yet they reached 200,000 after only 30 years.

set a scale of comparison between Jane Jacobs´ compact city in Greenwich Village and Edward Soja's Los Angeles?

Again and again, the city seems to escape from any attempt to define it, and, therefore, any plan to direct its future. However, there are some features that transcend historical eras, cultural and territorial barriers and enables us to define qualities that make it possible to recognize the urban condition of a human agglomeration, and build greater understanding of the urban phenomenon.

The urban event

The primary urban-condition-generator phenomenons are combinations or mixtures of uses, processes of simultaneous and diverse exchange in a given space. This means greater concentration of exchanges in a specific territory, more or less constant over time, and a certain qualitative redundancy in these processes. Some of the centers that swarm activities in the territory won in complexity and intensity of redundant exchanges to achieve a critical mass such that it generates an evolution in the systemic organization node. The system undergoes a "phase transition" (Johnson, 2003:99) starting from a mere human agglomeration to a production center of synergy and development not only for its internal structure: it is also able to be exported to the surrounding rural area and exchanged with other urban centers.

Following a theory of epigenesis[5] (Jacobs, 1969:144), cities are generated when, from a set of simple elements, intensity and exchanges redundancy is such that innovation processes and development of diversity occur because of them: Technological and cultural revolutions as the Golden Age of Athens, the Renaissance, the Enlightenment were produced by the synergy generated in cities.

Redundancy enables the development of new forms of exchange and the creation of new goods, services and ideas, and it is the peculiarity of complex systems like cities, social groups or ecosystems. The mechanical systems are logically oppose to this pose, being that it produces inefficient and impractical systems; redundancy implies a waste of resources. But the multiplication of exchange channels, actors with similar interests, and institutions, enables the creation of new `espontaneous' feedback loops in the system, the ability to generate creative synergy.

The notion of intensity of exchanges to define the urban condition -that goes beyond the physical density-, is called synoecism. This concept, proposed more or less explicitly by several authors[6], involves the diversity of actors and flows/objects of exchange, coupled with sustained intensity of these exchanges over time in a given space. It is both stimulation of the urban activity and its intrinsic driving force (Soja, 2000:21, 41 et seq.). In urban and economic geography, this concept includes the economies of scale and agglomeration (Camagni, 2005), which redeemed the vital role of spatial proximity and encouragement of the dense urban agglomeration.

Furthermore, redundancy gives an urban center flexibility and resilience required to adapt to external or internal changes affecting its operation, and evolve constantly. An example - In contrast to this- are the large agglomerations, socially homogeneous and productive know as the company towns. Their lack of diversity -which does not mean lack of division of labor, but few alternative production processes- prevents a truly innovative development, growing demographically or spatially but never reaching the dynamism of a real city (Jacobs, 1969). They are much simpler structures, where external

[5]Biology, epigenesis predicts that embryonic organs are formed from nothing, through induction by the environment. By extension, in systems theory, it means mechanisms that allow an individual to modify certain aspects of their internal or external structure as a result of interaction with their immediate environment. Epigenesis therefore represents the process of "tuning" whereby each individual adapts efficiently to their environment through the capabilities contained in its genetic code.

[6]Jane Jacobs (1969), Henri Lefebvre (1969) are the main authors in developing the concept, taken by Edward Soja (2008) and although Max Weber speaks of 'sinoikysmo' of Greek cities (1987: 99) -.

change -for example, a change in the international production lines- produces the collapse of the whole urban system. They do not have enough flexibility nor resiliense to promote alternative productive activities for the population. Their `small village' idiosyncrasy contrasts to their relative big size, its economic productivity (GDP) and use of resources.

To synoecism, it shall be add the dynamic and evolving condition that define the status of an urban agglomeration: the term `urban event ' arises to define the condition of urbanity, overcoming any definition that involves the determination of rigid and static cultural or spatial structures.

This is a qualitative leap from mere socio-territorial agglomeration to the complexity of the urban condition, which depends more on the processes of interaction in the time that on the elements that quantitatively define an urban area; if it is true what it says Edward Soja (2000:225), Lagos, Sao Paulo Mumbai or Singapore can be as revealing as Los Angeles, Paris, Chicago or Manchester. Cities are more than the sum of buildings, its streets, its money: the cities are made by men capable of seizing opportunities. (Jacobs, 1969:160)

Conclusions on efficiency and sustainability.

A sustainable society is one that is able to meet their needs without compromising the opportunities of future generations; but also one that is able to interact with their environment in an efficient way, minimizing entropy levels exported to it, to maintain or develop its internal order. Based on the systemic approach, sustainability is a direct consequence of the principles of interdependence, assosiation, flexibility and diversity.

The operational lines raised by UN-Habitat drive processes of generation or intensification of feedback loops that create the critical mass necessary to achieve the urban condition: a compact and connected city; integrated, inclusive and intense; It proposes simultaneous action at multiple scales, with strategies to promote social, economic and functional diversity, recognizing the practical grounds that directly affect sustainability, resilience and adaptability of an urban system. (UN-Habitat, 2014b)

The strategies begin raising the efficiency of the life cycle of the material resources needed by the urban system for development, and they are complemented by optimization of urban structure built with `filling´ processes and completion of the existing fabric to complement the `guided growth by extension´ of the city.

The functional and spatial accessibility, quality public spaces, housing -access to habitat- and social cohesion directly influence the processes of inclusion and acceptance of the difference; also they influence a more equitable system, allowing players to have more visibility in the system (Rueda, 2015b). The open and participatory planning considers the ability of individuals to change their relative position within the system based on the information and resources that are able to manage. They increase the knowledge generated and used by the urban system, and help define a city model shared by all.

Under this operational framework, the sustainability of the city is understood not only as an opportunity to achieve more efficient development -economic, political, and cultural-, but as the equitable distribution of the benefits and opportunities of an urban system. Aim at greater efficiency and sustainability means pursuing greater social justice in urban development (Harvey, 1973:97); understanding the city as a necessarily complex, dynamic, and intense event involves reconciliation with the urban condition and its potential to achieve a higher quality of life for all.

References

Batty, M. (2013) *The New Science of Cities* (MIT Press).
Camagni, R. (2005) *Economía urbana* (Antoni Bosch editor).
Harvey, D. ([1973] 2010) *Social Justice and the City* (University of Georgia Press).
Jacobs, J. (1961) *The death and life of great American cities.* Random House.
Jacobs, J. (1969) *The economy of cities* (Random House).

Johnson, S. (2012) *Emergence: The Connected Lives of Ants, Brains, Cities, and Software* (Simon and Schuster).
LeCorbusier (1946) *Propos d'urbanisme* (Éditions Bourrelier).
Lefebvre, H. (1975) *El derecho a la ciudad* (Edicions Península 62).
Luhmann, N. (1995) *Social Systems* (Stanford University Press).
Prigogine, I., and Stengers, I. (1994a) *Entre el tiempo y la eternidad* (Alianza Editorial).
Prigogine, I., and Stengers, I. (1994b) *La nueva alianza: metamorfosis de la ciencia*. (Alianza).
Rueda, S. (2014) *Ecological Urbanism: Its Application to the Design of an Eco-neighborhood in Figueres* (Agència d'Ecologia Urbana de Barcelona).
Rueda, S. (2015a) *Habitabilidad y calidad de vida*. Retrieved from http://habitat.aq.upm.es/cs/p2/a005.html
Rueda, S. (2015b) *La ciudad compacta y diversa frente a la conurbación difusa*. Retrieved from http://habitat.aq.upm.es/cs/p2/a009.html
Salingaros, N. A. (2005) *Principles of Urban Structure* (Techne).
Soja, E. W. (2000) *Postmetropolis: Critical Studies of Cities and Regions* (Wiley).
UN-Habitat. (2013a). *Prosperity of Cities: State of the World's Cities 2012/2013*. UN HABITAT.
UN-Habitat. (2013b). *State of the World's Cities 2012/2013, Prosperity of Cities. New York: Routledge*. Retrieved from http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3387
UN-Habitat. (2014a). *The City We Need. Research and Academia. United Nations, UN HABITAT. Urban Thinkers Campus.* Retrieved from http://unhabitat.org/urbanthinkersdocuments/
UN-Habitat. (2014b). *United Nations Human Settlements Programme*. Retrieved December 5, 2014, from http://unhabitat.org/
Weber, M. ([1921] 1986). *The City*. Glencoe (Free Press).

The form of the European city in the work made by Karl Gruber (1885-1966)

Gianluca Gnisci
Dipartimento ICAR, Politecnico di Bari, Via E. Orabona 4, 70125, Bari, Italy
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Abstract

This study focuses on Karl Gruber, a central figure in the German architectural debate of the first half of 20th century, and the importance that his contribution can offer to the study of the shape and character of the "European city".

Erwin Karl Gruber (Konstanz, 1885 - Darmstadt, 1966) was a German architect who trained at the Technische Hochschule in Karlsruhe under the leadership of Friedrich Ostendorf. In 1924 he was appointed professor of "mittelalterliche Baukunst und Entwerfen" (medieval construction and design) at Technische Hochschule in Danzig, and in 1933 obtained the chair of "Städtebau und Altertümer" (Urban design and antiquities) at Technische Hochschule Darmstadt.

He is the author of numerous studies on urban morphology, from ancient to the modern city. His most important work, Die Gestalt der deutschen Stadt (The form of the German town), is a study on the formation processes of the city that changed according to the spiritual order of the era. Gruber's approach to the study of the city aims to show the relationship between the shapes of cities and their political, religious and economic organization. He describes the shape of the city such as the construction of a space that is based on the hierarchical opposition between sacrum and profane, public and private. His attention focuses in particular on the medieval age, recognized as the heyday of German cities. His analysis is not only urban but involves also the buildings types that make up the city, from house to specialized buildings, also in their local variants.

Figure 1: Besigheim, Baden-Württemberg, view of the old city from the Enz river © Gianluca Gnisci, 2015

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Introduction

This study focuses on Karl Gruber, a central figure in the German architectural debate of the first half of 20th century, and on the importance that his contribution can offer to the study of the shape and character of the European city.

Erwin Karl Gruber (Konstanz, 1885 - Darmstadt, 1966) was a German architect who trained at the Technische Hochschule in Karlsruhe under the leadership of Friedrich Ostendorf (1871-1915). In 1924 he was appointed professor of "mittelalterliche Baukunst und Entwerfen" (medieval construction and design) at Technische Hochschule in Danzig, and in 1933 obtained the chair of "Städtebau und Altertümer" (Urban design and antiquities) at Technische Hochschule Darmstadt.

He was author of several studies on urban morphology, from ancient to the modern city. His most important work, Die Gestalt der deutschen Stadt (The form of the German town), is a study on the development of the city. In his opinion, city changes according to the spiritual order of the era. Gruber's approach to the study of the city aims to show the relationship between the shapes of cities and their political, religious and economic organization. He describes the shape of the city referring to the construction of a space that is based on the hierarchical opposition between sacrum and profane, public and private. His attention focuses in particular on the Middle age, recognized as the heyday of German cities. His analysis is not only urban but involves also the buildings types that make up the city, from houses to specialized buildings, also in their local variations.

Karl Gruber: his education and his thoughts

The school of Karlsruhe, at the end of XIX century, is marked by the presence of two strong personalities of the German architectural scene: on the one hand Carl Schäfer (1844-1908), interested in constructive logic and artisan skills of the Middle Ages, on the

other hand Joseph Durm (1837-1919), interested in the beauty of classical antiquity and the Italian Renaissance. In this scenario, Gruber follows the path of Carl Schäfer and his successor Friedrich Ostendorf, sharing the search of universally valid laws that exceed the diversity of styles and eclecticism. According to them, these laws reside in craft forms or, more generally, in gestalteten Konstruktion, in the bonds that material and function impose to the architect. In this sense, the Middle Ages become the reference point for a deeper understanding of the relationships between form and construction.

According to Gruber then, the only way out of the chaos of the "modern" era is to define clear concepts. To find it is necessary to examine the laws that have governed the life, and then the architecture of the past. The goal of Gruber is more than just a historical analysis: with his book on the form and character of the German city he intends to build a bridge between the past and the present[1]. Moreover, as pointed out by Jacques Dewitte, the book of Karl Gruber, Die Gestalt der deutschen Stadt, « abundantly overflows from the framework set by his title»[2]. In fact, it is a reflection on the fate of the European city, not only the German one, starting from the Greek city. According to Gruber, the history of the European city can be reduced in two timelines with a similar development: the first goes from classical architecture to the late antiquity (the late Roman Empire, AD 284-476), the second one from the Middle Ages to the Baroque (meaning with this the period from the Renaissance to the age of absolutism). Within these two sequences we observe a similar evolution: it goes from the marked contrast between the sacred and the profane to a progressive cancellation of this contrast that occurs with the predominance of "outer space", the development of axiality and the creation of "spatial sequences". This trend corresponds to a progressive regression of the religious order in favor of the order founded on political power.

The Greek and the Roman city

The first timeline on which Gruber focuses in his book is that of the passage from the Greek city to the Roman one.

Through the example of Priene, Gruber defines the Greek city as a city governed by the order of religio. As in the medieval city, architecture expresses its maximum degree in the sacred buildings. The city is based on an orthogonal grid, reclining on landscape, that divides the urban area in insule. No public building is located on the axis of a road or placed in the middle of a field of view. All sacred enclosures are located within the blocks, so that the roads flow only in front of them. They are built in horizontal way forming on the valley side terraces supported by massive walls that highlight the buildings located on the platforms, elevating them above the mass of profane buildings. All religious buildings have the same orientation, with the temple of Athena Polias that crowns and dominates the skyline (Stadtbild).

It is through the sharp contrast between the colonnade of the temples and the continuous walls without windows of the houses facing the streets, that the construction of the Greek city emphasizes the primacy of the sacred and the public on the profane and the private.

The Roman town has no longer the same appearance of the Greek city. It continues to be divided into blocks through a network of orthogonal streets. But it differs from the Greek city on two points: the Roman city is clearly separated from the surrounding landscape; the Roman town is structured on two main streets that meet to form a cross - the cardo and the decumanus. The spatial conception and representation of building

[1] «If this book can contribute at least to the clarification of concepts, to the knowledge of the timeless laws and, from these, to a mutual understanding between the ideas that today is fiercely debated among architects, this would be his biggest hit». Gruber, K. (1952) Die Gestalt der deutschen Stadt: ihr Wandel aus der geistigen Ordnung der Zeiten, Verlag Georg D.W. Callwey, Munich

[2]Dewitte, J. (1985) Corps et espace, sacré et profane dans la ville. Reflexions sur la pensee urbanistique de Karl Gruber, postface to the French edition of Forme et caractère de la Ville allemande, AAM, Bruxelles.

and square reflect the plan of the city. Important monuments are usually placed on the vanishing points of the roads. As in the Temple of Baalbek or in the Forum of Trajan, the temple with podium recedes on the back wall of the sacred precinct becoming the end point of an axial sequence of spaces (Raumfolge). The strict est orientation of the temples is abandoned in favor of spaces of representational purposes. This is the symptom of a weakening of religious ties.

Throughout his research, Gruber constantly focuses on the difference between two possible ways of building the city: a planning like that of the Greeks, which lets the individual building develop freely, and a planning, as the Roman one, that lets it manifest only as part of a total plan.

So, the plan of the Roman city becomes much more rigid than that of the Greeks. «The whole urban fabric is subjected to a symmetry axis, so that the individual elements, as in the Forum of Trajan, have just a role of pars in toto»[3]. It is towards this form that all ages with a high concentration of government power has always designed the urban architecture.

The transition to the Middle Ages: the genesis of the German city

The transition from the Roman to the Middle Ages is through a difficult period, characterized by the barbarian invasions and the decline of antiquity, but it is here that the history of European cities begins.

For this prehistory of the German city, there is not a most important document as the ideal plan of a Benedictine monastery kept in the library of the abbey of St. Gallen, dated to the early IX century. The symmetry of the great built bodies is not an abstract scheme but the essential expression of the inherent meaning. Two towers in the west, two churches positioned one behind the other, two cloisters positioned to either side of the axis to close the set on the east side,: this is the solution to the space program that had been proposed, at the same time expressed in a strict form and elevated to an artistic dimension. This is the essential difference between the plan of St. Gallen and the Roman model: the axial com-

plex of the late empire are sequences of open spaces, courtyards, hollow spaces that, as in the case of Baalbek or the Forum of Trajan, were ordered along an axis to lead to a final point located at the center of the visual field. Here in St. Gallen appears something else in place of the spatial sequence of the late antiquity: the building mass (Baukörper). It rises again in the space as a group of buildings with a strong sculptural character with its two towers, two choirs and its large transept. The medieval architecture, like the classic one, considers the building as a sculptural mass, designed with the same care on all sides, without favoring one facade situated along an axis. But there is more: the plant of St. Gallen already contains, in an embryonic form, the different types of buildings that will be found later in the medieval city: the main body of the castle (Pallasbau der Burg) already present in the house of the prior, the hospital, the hotel (Gasthaus) - but above all, the houses of the craftsmen. It is the first time that the presence of a merchant class occurs in a project. It is a social state whose existence is the only condition that makes possible the formation of cities. «So we can consider this abbey project as the starting point for the construction of the German city: with the inspiration came from ancient, here has created a fusion of ancient heritage and the Germanic will»[4].

The order founded on religio: the Middle Ages

To trace the evolutionary history of a German city, Gruber uses the description of the development of an imaginary city by focusing on four historical phases considered emblematic for its formation. Each phase is enriched by a top perspective view and a skyline.

- The first phase shows a city after the foundation, in 1200.

A fortified castle set on a favorable site is at the origin of the settlement. A Benedictine

[3]Gruber, K. (1952), Die gestalt, op. cit.
[4]Gruber, K. (1952), Die gestalt, op. cit.

Figure 2. Tübingen, Baden-Württemberg, view of the old city from the Neckar river with the Hölderlin's tower © Gianluca Gnisci, 2015

monastery establishes under his protection. During the major religious festivals, a market develops (hence the word Messe remained in current German language to indicate the annual fair). The merchants, through the payment of a fee, enjoy the protection of the lord of the area. This practice soon turns into something stable. The lord gives his lands at the foot of the castle to the merchants who are established here. In exchange for fees, the lord gives them protection and builds the walls. This is where the city began. The lands are divided into equal lots, but despite this schematic subdivision, every citizen built his own house freely. Each house stands out from the others while binding to a local building type, determined by the number of floors, the use of the same materials and traditional craftsmanship. «A house next to another (Haus neben Haus) and each was a whole in itself»[5].

Along the main road widens to form the market, the town hall (Rathaus) and the parish church are built. The church, strictly oriented to the east, is at the center of an enclosure (Kirchhof) where is the cemetery. In townhouses (Bürgerhaus) built with Fachwerk, the old Germanic tradition of carpentry manifests; in the stone building of the convent and the church, the town hall and the castle, the ancient tradition is perpetuated. The parish church rises from everyday modest homes and marks the skyline with its presence.

- The second phase shows the apotheosis of the medieval bourgeoisie in the mid of XIV century.

Near the monastery, on the bank of the river opposite the city, an autonomous village equipped with its walls, its town hall and the parish church develops. The walls are enriched with towers and gates. Two new urban religious orders appear: the Dominicans and the Franciscans. The Franciscan monastery, along the hospital (Hospital) - another building type of this age, in which were housed the elderly who could not work - are at the center of another village, built on the outskirts east of the city center.

This way of building the city by parts corresponds to what Gruber called Wachstumge-

[5]Gruber, K. (1952), Die gestalt, op. cit.

Figure 3. Haus neben Haus, Marktplatz in Tübingen, Baden-Württemberg, © Gianluca Gnisci, 2015

setz, the law of growth, of the medieval city. «The medieval city develops as a natural organism, as a form composed of cells, as a plant or as a group of crystals whose parts are added constantly to each other according to a strict law of growth. But at the same time the different parts retain their autonomy despite their inclusion in the whole. They remain a totum in toto, a living whole within a whole»[6]. The expansion of the city takes place by addition of autonomous units, each one with its own value. New cities (Neustädte) are added to the old town (Altstadt), each of which is an autonomous entity having its own town hall (Rathaus) and its own church.

The difference between this city imagined by Gruber and the eastern German cities is due to the fact that the latter born as colonies in which, as in the Teutonic cities, a powerful lord had to quickly provide room for a population that flowed in the same moment. In the eastern cities, therefore, we do not find those rows of houses often irregular, with the projecting parts, that contribute to create the so fascinating streets and squares of the consolidated cities, as Dinkelsbühl and Nördlingen.

The same law applies to organic growth of the medieval city is reflected in the architectural composition: the religious complexes and the hospital, the palace of the lord and town hall consisted of the Gruppenbau, a summation of architectural masses, of autonomous parts, which together form the whole.

Bürgerhauser: the townhouse

«Bürger neben Bürger, Haus neben Haus»[7].

Just like in the social order of the city a free citizen is next to another free citizen, so in the streets and squares, a town house is next to another townhouse, and each house

[6]Gruber, K. (1952), Die gestalt, op. cit.
[7]Gruber, K. (1952), Die gestalt, op. cit.

forms a whole in a whole, each one a free personality. Free intended not in the sense of modern liberalism, that freedom without ties, but according to a "restricted freedom" (gebundene Freiheit). «This is not a formless equality, but an equality articulated in classes that bind the individual and at the same time make it free by giving him the dignity that belongs to every class»[8].

Free as an autonomous entity, the townhouse is an expression of freedom of the urban citizen. He decides where to place the front door, the height of the plans or the number of levels of the bow-window (Erker); no law prescribes the height of the roof. The medieval streets did not have continuous horizontal lines; the verticality of medieval architecture preserves the autonomy of the individual parts of the building.

Local materials, the stone from nearest quarry, the clay of the nearest furnace, determine the construction and the shape in the region in which predominates the massive construction (Massivbau); the essence of the wood, oak rather than spruce, influences the construction in the regions where the predominant technique is the Fachwerk. The construction technique results in different types of windows that, unlike the ancient city, play a fundamental role in the definition of the scale and the rhythm of the city.

The usual position of the townhouse is that of the Giebelhaus, with the gable fronting the street. The pediment, this triangle of strict form and strong geometric clarity, is the darling of medieval architecture of the North area. The gable closes on both sides the raked collar-beam-roof of the northern regions, the Kehlbalkendach. In the southern regions, however, it dominates the slightly sloping Roman purlin roof, the Pfettendach.

The width and the height of the building is expressed in the height of the roof. It becomes a powerful medium of expression that allows you to perceive the mass of the building in his corporeal and sculptural character, even when it is seen from the side of the eaves (Traufseite). Moreover, the Giebel roof with steep slopes requires the house a simple rectangular plan and therefore a clear and autonomous form of the building.

The order founded on power: the baroque period and absolutism

The image of the world is changed because of new scientific discoveries. The relationship with God changes. The humble attitude of Medieval man is replaced by the security man's self: nothing is more powerful than man. The order from the power succeeds now to the order of a religious nature. This is the background on which the third and the fourth phase develop.

- The third phase shows the rise of princely power in 1550.

Absolutism and gunpowder deeply modify the image of the city. The coexistence of two different parts of the city is no longer possible for defensive purposes; new fortifications are necessary. The juxtaposition of buildings that formed the castle is replaced by a unitary construction.

Urban projects made by Albrecht Dürer, published in "Instructions for the fortification of cities, villages and castles" (Nuremberg, 1527), already contain, in all their clarity, the features of the new era. The royal castle is the physical and spiritual center of the city. It is surrounded on all four sides from the houses of "advisors, servants and artisans of the king." The church, which once architecturally dominated the medieval city, is relegated in the east of the city.

- The fourth phase shows the era of absolutism around 1750.

If the Medieval city was administered and defended by its citizens and together with its surrounding villages formed an economic self-sufficient unit, now this will be just a joint of the prince administration, a fortress built as a defensive device.

Following the new spatial concept, the new residence of the prince is built, with all its related buildings: everything is designed as outer space (äußere Raum). The buildings that define these spaces are designed as walls (Raumwand) of an architectural uniform space. The absolutism does not need a juxtaposition of individual houses because it wants to give a visual demonstration of its power by creating "royal squares", as Place des Vosges and

[8]Gruber, K. (1952), Die gestalt, op. cit.

Figure 4. The barock city of Ludwigsburg, Baden-Württemberg, the Marktplatz © Gianluca Gnisci, 2015

Place Vendome in Paris. The blocks marked by the vertical rhythm of the pediments of each
1194 house give way to the "closed" block built on its four edges (geschlossenen Baublock).

But for the urban architecture serving the power, creating royal squares is not enough. The axis, designed as a sequence of spaces, become the favorite theme of urban outer space. This axis receives its significance from the point toward which it converges. This point is always a building of power. «The axis subjects to a center everything is to his right and to his left; this is the end of the part's freedom. Hereafter the part ceases to be a totum in toto and becomes a pars in toto»[9].

The desire to cover the walls of outer space with a continuous order, already contains a tendency to get rid of the typical instead of the universal. This is the way of the secularization of the sacred, and «in the neo-classicism which marks the end of this development, it ends up in a fatal equivalence unifying the church, the Stock Exchange, the town hall and the theater providing columned porches to all these buildings»[10].

The XIX century and the destruction of the historical city

If in the Middle Ages the building served God and, in the age of absolutism, served the Prince; in the nineteenth century it is put at the service of capital. The expansion of the city took place in full speed following, at first, the old system of orthogonal blocks. But, compared to the past, it has lost the measure of these blocks. It is no longer determined by adding the townhouse basic unit, but by a cold calculation made up to decrease construction costs and increasing profits of landowners. This is how the tenement was born.

If this is the case for the central areas of the city, the suburbs become the breeding ground for the creation of a new building type for the upper classes, the Villa. In a neighborhood of detached houses, surrounded by a strip of garden, it manifests itself more than elsewhere the total absence of a unitary spiritual attitude.

[9]Gruber, K. (1952), Die gestalt, op. cit.
[10]Gruber, K. (1952), Die gestalt, op. cit.

«The order ruled by the religio had produced the Medieval city, the order ruled by the power had produced the Renaissance. The unrestrained freedom of liberalism of modern times has created the mess of the modern city»[11].

Conclusion: news for the present day

The study of the development of the German city conducted by Gruber in the first half of the last century is crucial to understand the close link between each society to the way it builds city and architecture.

In every age it always refers to a spiritual order, religious or secular, establishing not only the hierarchy but also the order of values that find their expression in the lytic body of the city.

From these reflections come considerations about the development of today's city. In a society like the Western civilization, it seems difficult to find the hierarchy of values, starting from the spiritual. Therefore, the churches can no longer play any role in the profile of a city created by this culture. The power, for its part, has shown its limits flowing always in despotism.

«Why - asked Bruno Taut - we have to build with grace this house or that building if we do not know the main thing that gives meaning to all the secondary elements?»[12]. The thing that is missing in our time is a leading value, something that has to "crowned" our cities. If it can not be the church, nor the castle, maybe Taut is in right by aspiring to a landmark building that embodies the idea of a non-political socialism as mere relationship among men, a new cathedral in the heart of the city that bring men closer overcoming every conflict.

If this is a utopia, in the course of the '900 some concrete attempts have been made and Karl Gruber identifies the signs of a potential recovery in the experiences like the one of the housing associations. If the individual constructions can no longer guarantee the construction of a good city, since the "restricted freedom" has been replaced by a "unrestrained freedom", then a solution can be found in the construction of a collection of houses around a space of gardens, inspired by the models of collective buildings of the Middle Ages, as the Fuggerei in Augsburg or the Reihenhäuser in Gdansk. Still according to Gruber, the line to follow is that of discretion and simplicity of architects such as Heinrich Tessenow, driven by an attempt to return to a human scale, against the false pathos of the culture of appearance; or still in the experience of the garden cities that, according to Gruber, are useful to separate the cities from each other in view of an organic articulation of the metropolis in separate units. This tendency to articulate the city into human scale unity strongly reminiscent of the law of growth of the Medieval city.

Maybe it is time to start a new timeline, whether it be a new antiquities or a new Middle Ages, and to seek a new spiritual order to build the hierarchy of values of our time. «This is certainly not to build today the Medieval city. It is rather to refer to the timeless and eternally valid laws of the Gestalt which are the only ones capable of overcoming this urban chaos»[13].

References

Taut, B. (1919) *Die Stadtkrone, Jena.* Ed. it. Edited by Quaroni L., *La corona della città, Milano* (Gabriele Mazzotta Editore)1973.
Gruber, K. (1949) *Der heilige Bezirk in der zukünftigen Stadt.* (Eine Utopie aus der Zeit des zweiten Weltkrieges.) (Regensberg, Munich).
Gruber, K. (1952) *Die Gestalt der deutschen Stadt: ihr Wandel aus der geistigen Ordnung der Zeiten* (Verlag Georg D.W. Callwey, Munich).
Romero, A. (1990) *Baugeschichte als Auftrag* (Vieweg+Teubner Verlag, Braunschweig).

[11]Gruber, K. (1952), Die gestalt, op. cit.

[12]Taut, B. (1919) Die Stadtkrone, Jena. Ed. it. Edited by Quaroni L., La corona della città, Milano, Gabriele Mazzotta Editore, 1973.

[13]Gruber, K. (1952), Die gestalt, op. cit.

Chair_Nicola Marzot I Susan Whitehand
University of Ferrara, Italy, and TU-Delft, The Netherlands
School of Architecture and Planning The University of Auckland, New Zealand
University of Birmingham, United Kingdom
Co-Chair_Cristina Tartaglia I Alessandro Oltremarini
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197,
Rome, Italy

Urban Form and Theories

Urban Form and Meanings

Reading Urban Form

Urban Morphology Methods

Fringe Belt Analysis

Geographies of the Mediterranean city: the meaning of urban forms

Mariangela Turchiarulo
Dipartimento di Scienze dell'Ingegneria Civile e dell'Architettura, Politecnico di Bari, Italy
Keywords: geography, urban form, urban morphology, Mediterranean medina, Ottoman city

Abstract

The relationships between the Ottoman Empire and Venice, the Adriatic and Central Europe strongly influenced the social and urban order of a city model that paid tribute to Asia and the West but is also far from the principles of the eastern Mediterranean city and from those of the walled European city (whether Greek or Arab).

The differences are formal and structural, even though the district (mahalle in the case of the Ottoman city; khitat in North Africa) constitutes the foundational unit of the urban fabric, both in the open Ottoman model and in the closed, North African for instance, one (consider the Tunisian cities of Al-Kairawan and Nabeul). First and foremost, unlike the Mediterranean medinas and European walled cities, the Ottoman city is an open city, not enclosed by walls (unless they date from an earlier period), therefore, in a relationship of continuity with the surrounding countryside, the expression of an urban society that "appropriates" the rural world: this is why the architecture of the city is, fundamentally, a landscape architecture. The Ottoman settlements extend into the countryside, going beyond the traditional contrast between architecture and nature specific to European and Arab-Islamic walled cities. The former sites are usually characterised by special topographical and landscape conditions, which document how the origin of Ottoman settlements is to be sought in the link with the architecture of the soil rather than with a geometric plane: it is the site that determines the choice of settlement and type.

Introduction

Through the description of three paradigms, this paper focuses on the relationship between urban morphology and physical geography. It could be a possible tool for the project (not only for the analysis), starting from a key consideration: *territory* is, essentially, *architecture*. It cannot be imposed as a will to form a priori, since the singularity of the place determines the order of the architecture, and not the contrary, even when there is a pre-established formal model. The city describes itself as the place to live in, the "territorial type": urban facts correspond with territorial facts in a scale process. (Ravagnati, 76)

Strabo says that the geographer must have full knowledge of the design to represent sizes, shapes and distances of places, as well as the architect has to know all these things in order to allocate cities and buildings. (Desideri, 1792)

The geomorphological, geographic and climatic characteristics of a site determine "urban landscapes" and "settlement systems" within a morphological continuity with the physical pre-existences, the geographical context, the topographic peculiarities and the morphological structure of the territories. The settlement is organized following precise geographical cornerstones telling the story of a territory and a civilization: settlements of ridge, at the confluence of two compluvia (headland), along the hillside, in the valley and the coast. Moreover, paths marking ridges, anticlines or isthmuses; tracks influenced by interposed hydrographic structures; centuriations; territorial infrastructures such as canals, harbours, bridges and aqueducts which become urban architectures; enclosures that emphasize meanders and river crossings; foundations anchored to the subsoil hydraulic system; architecture merged with the site topography. The territorial model, against any ancient urban-centric vision, becomes the starting point for the city project. In the Mediterranean landscape, trading routes and stopping areas are the elements causing the urban form. The city is part of a system in which the overland routes and waterways are the main framework. (Motta, 130) Starting from his consideration Caniggia develops his studies, both in a territorial and in a urban scale. He says : «the first use of a territory and the first awareness the man takes on it, is the possibility of walking through it, directly related to the orohydrographic structure». (Caniggia, 187-207)

Vincenzo Scamozzi, in his treatise, says that the geography of places offers a reference model for the urban form; the architectural design is, therefore, closely linked to the operations of representation and description of the place geography. In fact, according to him, the architect must perform two founding actions for the city project: drawing the enclosure and put it on plan. Scamozzi describes an analogical relationship between cities and island: the latter is used in its broadly speaking, as a metaphor expressing the condition of "isolation" and "clipping" of a land section. In fact, the design of the enclosure "isolates" the city from its territory (the walled city is emblematic). It has a formal and structural link with the context: a settlement on a top of a mountain or a hill living in a state of "isolation" like a city of a plain landlocked in a confluence of rivers or canals or, literally said, like an island city. Therefore, for Scamozzi, the first effort to be done is to recognize the "insular shape" of the site which, in turn, has to adapt to the rules of the geometric and architectural representation. Scamozzi's city has a geographic foundation, just like that of Filarete. In his treatise, the latter also describes the architecture as a nature representation. So, the territory forms become the key instrument of urban design, the compositional theme in defining the urban morphology: by overcoming the naturalistic and approach imitative, the city becomes rational transfiguration, sometimes geometric, also leaning to a regular grid construction, able to adapt, from time to time, to the peculiar site conditions. So, even if there is a rigid formal order imposed from the outside, the geographic and topographic characteristics always give a mark linking the city, as the singular building, to the specificity of the site. (Martí Aris, 88)

The city and the sea: the city as "island"

«The best way to experience the city is to walk about quite aimlessly. Once the first sense of estrangement is over, the mind finds its surcease in the discovery of the dream-city Alexandria which underpins, underlays the rather commonplace little Mediterranean

Figure 1. From top to bottom. Views of Kairouan, Alexandria of Egypt, Istanbul. [Turchiarulo M., 2005, 2007, 2011]

seaport which it seems, to the uninitiated, to be. It plays even today a somewhat unwilling role as a second capital for Egypt, the only relief offered a resident of Cairo that burning-glass of a city wedged between its deserts. It opens upon a dreaming sea and its Homeric waves are rolled and unrolled by the fresh breezes from Rhodes and the Aegean. Going ashore in Alexandria is like walking the plank for instantly you feel, not only the plangently Greek city rising before you, but its backcloth of desert stretching away into the heart of Africa. It is a place for dramatic partings, irrevocable decisions, last thoughts; everyone feels pushed to the extreme, to the end of his bent.» (Foster, xii)

The seaside city is a linear city which has got a potentially infinite growth. It is an "island-city", a space of passage running along the transit routes where people and goods travel; it can rule and control the geographical space thanks to the port and road infrastructures representing its essence. (Ravagnati, 25)

Since the Hellenistic period geography and geometry have been represented the city of Alexandria, in the west of the delta Nile, on a strip of sandy land which separates the Mediterranean sea from the Mareotis lake. When Strabo speaks about this city (having the form of a Macedonian chlamys, as Pliny said) writes: «It is watered by two seas: the one in the north, that is the Egypt Sea, part of the Mediterranean; the other, in the south, called Mareotis lake or swamp». The southern limit of the ancient city was bordered by a navigable canal from the south-east, from the Nile: then, it crossed the city, towards its western edge, bending sharply to the north, and flows into *Kibotos* (box), a small gulf within the *Eunostos* port; the little streets, perpendicular to the sea, were set on the ancient tracks of twelve rivers and, even today, they form the modern city.

Alexandria lives a steady tension between the Euclidean rigor of the Hippodamian by cross-axial system and the natural topography of the soil: the artificial hills, the waterways, the articulated natural, artificial, maritime, lacustrine and fluvial port-system; the complex water supply networks, made of culverts and tanks.

Sea, rivers, canals and lake are the geographic elements that determine, from the beginning, the *forma urbis* of the main port city of the Mediterranean and that, today, in the almost total absence of open spaces, manages to regain the relationship with the water and rural landscape, only in the periurban areas.

The compact and open urban structure has a potential infinite and linear expansion which is also parallel to the coast line. The city of Alexandria, over the centuries, grows according to a rhizomatic logic. Its urban history, even in its processual development, is manifested in two complementary ways, generating a "catalog of forms": as a horizontal layerings of cities rooted in an archetypal form, the Hellenistic, preserved as mineralized fossil, geological storage of urban sediment; such as *addition* of juxtaposed parts following, in their aggregate, the geometric perfection of the isthmus, transforming an island (Pharos) in a peninsula (known today, as Ras-el-Tin promontory). Thus to the east of the city of foundation laid out to Deinocrates' plan, the Romans added their city; then, in the nineteenth century the European city, whose rotation clearly matches the morphology of the isthmus, was "hooked on" orthogonally to the earlier sixteenth-century Ottoman Turkish city that in the meantime had come to occupy the Ras el Tin peninsula.

The Hellenistic spirit was wedded with the technical and material contributions of the Western cultures brought from Europe by the exiles employed at court by Muhammad Ali, after the industrial revolution. (Turchiarulo, 334-336)

The newly imported building types change the urban fabric morphology to suit a new modus vivendi. The Turkish-Ottoman fabric underwent major demolitions to make way for new spaces of social relationship previously unknown in the local context (public squares and boulevards); building lots were reclaimed from the sea to give the city a promenade looking out towards the horizon. The seafront unifies a city of fragments, a city that had been fortified and now opens its gaze to the Mediterranean (Turchiarulo, 117-138), bringing, under the "layer" of European origin, the imprint of the Hellenistic-Roman one.

Like a phoenix, it was reborn from its ashes: the modern city finds its anticipation in the Hellenistic period.

It bears the imprint of the eighteen huge insulae (44 x 88 m), and of its typologies (oikos and peristyle), of the main streets (Canopic and Sema).

In many cases, the structure of the Mediterranean city is consolidated on the "re-use" of archaeological traces left by remote settlements; it is built on the remains of ancient buildings, sedimented materials through a process of continuous layering, juxtapositions and changes suited to the place topography. Probably, it is not sufficient the scientific analysis of its physical reality, made with precise philological rigor, to fully discolse the *soul of the city*, to explain the reasons of its past and recent configuration. This is the case of Alexandria, a cosmopolitan and global city-mosaic whose heterogeneity is the beating heart of its urban development and transformation. *Melting pot of cultures and races, crossroads of destinies and passions*, it reveals its enigmatic and kaleidoscopic soul in its own imaginative dimension. (Martí Aris, 83-86) It is a city that found the etymology of its form in the willing to shape the nature and to impose an order: the architect Deinokrates proposed to Alexander the Great to carve Mount Athos in human form, putting in one hand a city and in the other a lake. (Russo, 241) It is a myth that well symbolizes the meaning, the value and essence of the landscape: the archaic relationship between natural and human-transformation, between nature and artifice. Just as result of this bizarre and utopian project, the Macedonian conqueror decided to entrust the architect with the new city founding plan.

Desert city: the city as "clod"

«Below the Sahel, to the south of Sousse, which is 60 km away, in the middle of a vast plain, desert during most of the year, Kairouan raises its light brick walls, its minarets, its domes. At the edge of the enclosure, the huge cemeteries recall the long centuries of its urban life. This great city, isolated in the middle of the flat region, far from the sea, certainly looks like a nomadis camp.» (Marcais, 180)

The desert city is a compact city, enclosed in a fence that protects it from a hostile landscape. It is a fixed and resting space (it is not a crossing place as is the city of the sea), living turned in on itself, around its civic and religious institutions.

While the European city is based on a "secular" model, the Islamic city is an hermeneutic act: it is called "medina" and contains, in its etymological, structural and formal root the religious dimension: din, in Arabic, means "religion". The City of the Prophet, Medina (in Arabic: *al-Madina al-munawwara*, "The city radiating light"), in the *Annals* of the Assyrian era, is remembered as Yathrib (in Aramaic: "justice"). This etymological analysis emphasizes that religious and political ideal bind Islamism to the city and urban life: thus, it is not a religion of nomads wandering in the desert, like the one postulated by an older romantic vision, but a "citizen" religion.

Therefore Islam is an urban fact which is manifested in a precise city model, built around three main points: the mosque (*masjed*), the Koranic school (*madrasa*) and the pious foundations (*waqf*). However, Paolo Cuneo states that «[...] three variables, history, geography, ethnic diversity, and the possibility of endless combinations, offered to Islamic culture, inherently unified, in many ways, closed and equal only to itself, the conditions for an extreme diversification of urban phenomena».

Semerani writes that *everything comes from the East*. Certainly, the history of the European city cannot overlook the influence that Islamic culture has had, from the Middle Ages until the beginning of the modern age, in theoretical and philosophical thought, in modern historical geography.

Just think the work, of Platonic inspiration, *Ideas of the inhabitants of the virtuous city*, by the philosopher Al-Farabi; or, the survey on geographical explorations, *al-Rihla*, by the traveller Ibn Battuta; and yet, the modern scientific studies about urban history, understood as the civilization history, introduced by the philosopher Ibn Khaldun (*Muqaddimah*, Prolegomena). In particular, the latter begins to consider the urban problem, not only in relation to the political and social events, but also in relation to the physical and economic territory, against all sector, intellectual and formalistic simplification. (Guidoni, 193-195)

Figure 2. From top to bottom. Ortho-photos of Kairouan, Alexandria of Egypt, Istanbul and their environs [Turchiarulo M.]

Two rivers, the desert and a caravan route affecting the morphology of Kairouan medina (Turchiarulo, 19-33): the oldest Muslim center in North Africa and the ancient capital of Ifriqiya. It lies between the Mountains Atlas and the Mediterranean Sea. It was founded as a parade ground in the middle of a plain, very fertile at the time of the first Arab conquerors. Its origin first as military camp, then as caravan city is mainly due to its strategic geographical position: even today, an ancient and important road, connecting Tunis to Gabes, crosses the medina in the center line, longitudinally. Along the segment, intercepted inside the walls, two gates (of the eight) are aligned: the Bab Tunis and Bab Jalladine. Two *uidian* (plural of *uadi*, *wad, oued*, stream), Zeroud and Marguellil, washing Kairouan in the north and south: over the centuries, their frequent floods have strongly influenced the morphology and the direction of the city development through alternating phases of expansion and strong contraction.

The structure of the new Kairouan, founded by Uqba in 670, recalls models of the Umayyad city. It is a city model which incorporates the Roman system on two axes, the cardo and the decumanus, intersecting at right angles, with the consequent opening of the four gates. This is the possible original town planning scheme.

Today, it is a closed and compact city, a mosaic articulated in tiles, in "clods", formally and spatially recognizable. The fullness prevails on emptiness. The city has a constant thickness: it is a basement from which only the minarets and mosques domes rise out; a continuous and compact mass, engraved, hierarchically carved from empty spaces: those narrow and branched of the fork streets, innervating the urban fabric; those approximately square of the courts piercing the "plate".

Inside the existing walls, in an eccentric position, the Grand Mosque lies: worship place, once also Arengario. In earlier expansion steps, the building position was barycentric compared to the surrounding urban fabric.

While *madrassas* and *zawiyas* often result by a specialization process and private houses recast, mosques appear to be generating urban fabric. It is possible to recognize two different orientations. The most common direction is one that follows the orientation of the Great Mosque: 53° to the southeast. This direction is also found in agricultural partitions, outside the walls. It highlights, to the north-east of the city, near the *uidian*, the probable traces of the Kairouan extension, after reached until its current size. This alignment is due to the shape of the city during Aghlabids period, that is the period of maximum urban expansion. Its extension was higher than today and the city extended to the vicinity of *uidian*.

Probably, alignments with significant corner variations, belong to further spontaneous expansions phases abandoning the prevalent orientation, imposed by the Great Mosque, and following different directions: those of the caravan routes and primary or secondary paths.

The trading system center is the street of the souk, which is the segment of the ancient caravan route, from Bab Tunis to Bab Jalladine. This road is linked to the heart of the medina through covered walkways and separates two districts: the Cherif (Houmet Ech Chourfas), to the west, and the Grand Mosque (Houmet Ejjamaa) neighborhood, to the east.

The urban fabric is made of a network of neighborhoods: they are clearly recognizable in their shape and size, with its own identity and autonomy. Everyone includes inside the residential fabric, its own mosque (*masjid*), a fountain and a hammam: it is bordered outside by streets from which deepen, according to a hierarchical "tree" structure, the *cul de sac*. These are real roads of penetration to the urban fabric, leading into the heart of the "clod" (macro-unit, *khitat*) and, sometimes into the house, whose lot is foundational as the elementary cell. In particular, the *culs de sac* are derived from the original lots of housing units, taking as width the dimension of an elementary cell: an important element of mediation between the public space of the street and the private sphere of the house, organized around the courtyard. The basic unit of settlement is represented by the lot of the courtyard house.

Therefore, the neighborhood looks like a city inside a city, an enclosure inside an enclosure: so, it seems to express the ethnic isolation of different tribes who, with the Hegira, pass from a Bedouins condition, in constant motion through the expansive desert, to a permanent condition: from outside to inside the walls, where the urban organization (through neighborhoods, *khitat*) reflects a social organization based on the distinction in

ethnicity and crafts. The medina is a fence; a large caravanserai in an empty plane, a desert; a milestone in a hostile and boundless landscape.

The city and the slope: the city as "forest"

«No one knew which way to look. We had on one side Scutari and Kadi-Kioi; on the other the Seraglio hill; in front of it Galata, Pera, the Bosphorus. To see everything, it was necessary to turn on themselves; and we were turning, throwing all sides the flaming glances, and laughing and gesturing without speaking, with a pleasure that was suffocating.» (De Amicis, 16-17)

The urban history of the Mediterranean cities, according to Petruccioli, can be traced through three basic steps: the prehistoric world of the ridges, the Roman Empire and the Ottoman one. The mesh of the ridges allows one to grasp the meaning of the oldest form of human settlement in the territory: to move up, for the prehistoric man, means to be able to orient directly with the topography and to control the territory militarily. With territorial grids of the Roman centurions, the political and military control is guaranteed, on the contrary, by a "geometric" control developed from the minimum family unit (*domus*) up to the municipality and *regio*. During the Ottoman rule any systematic and unitary modification of the territory was left apart as well as any regular geometric structure: we act for parties, through the installation of monumental pious foundations (*imaret*), centers where city develops. (Petruccioli, 170-174)

Through the identification of this third paradigm, which uses the metaphor of the forest, we want to describe the character distinguishing all urban fabrics, from the Ottoman era, embedded in the landscapes of the western Balkans and Anatolia, often territorially organized in a high part and a low very close to the coastline. It is a model of an open city, which "flows" following the "rhythm of places" and that finds its *raison d'être* in the relationship of strong interpenetration between built and natural.

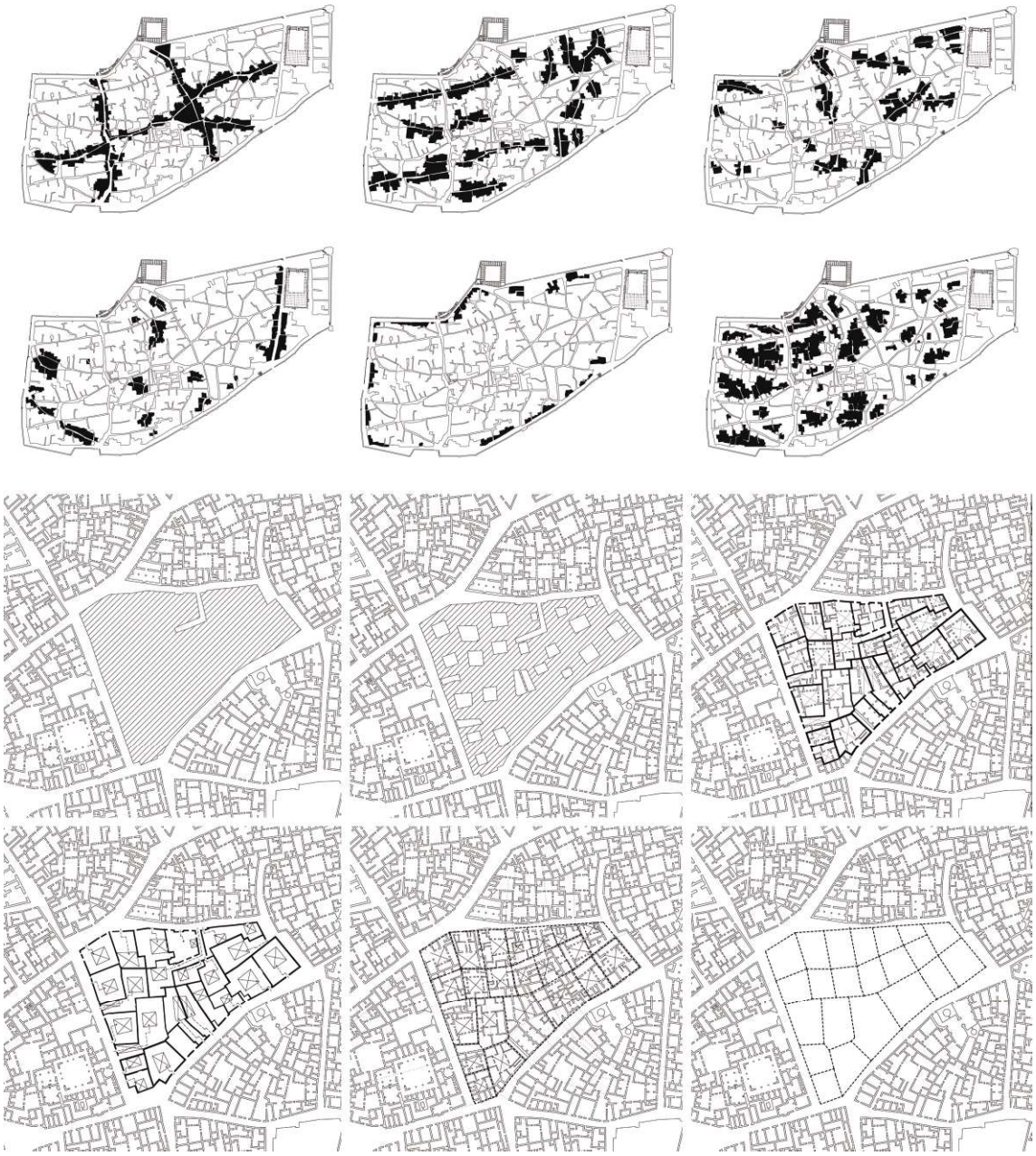
These are cities building their form incorporating nature in their "design": the Bosporus, the Golden Horn and the hills are elements perfectly integrated into the urban structure of Istanbul: in this *mosaic of ports*, *geography* (indeed the geographies!) *causes the history, and the ancient produces the project.*

In general, we can say that the Ottoman city (Turchiarulo, 23-45) is made of individual free elements rooted to the ground and not of compact parts: the sofa house, central and tripartite, is a type that stands isolated in the garden refusing aggregation. Therefore, the Ottoman city is a "punctual city", built by a sequence of rooms, dotting the cityscape in separate units. They do not build the public space and even identify its perimeter. They do not represent the place, understood as geographical site, but redefine it. The countryside belongs to urban and vice versa. It is a town product of a urban society deeply exploiting the rural world, divided into two distinct parts: the *čaršija*, or public and commercial area, and *mahalle*, or residential neighborhoods.

The residential fabric of this polycentric city, well described by Cerasi, is a fabric in open series and is set on regulatory tracks: the main routes follow the course of contour lines; the secondary link up the jump altitude. Therefore, it is divided into a terraces settlement system, for isotope lines, with a preference for a precise solar thermal orientation and panorama. The principle of settlement of the Ottoman house, based on an aggregation of the rooms in free standing schemes, allows a great flexibility, so if the ground floor is bound by uneven road network and by its relationship with the physical geography of the area, with the rotation and the upper floors projections we can enjoy, however, the best orientation and the best disposition.

The intensive use of the *hortus clausus*, specifically Mediterranean custom, characterized by the filling in of the lot from the edges inward, is substituted by the extensive use of land, specific to the Ottoman model. The plot on the terrace is the foundational unit. The single-family house is built in the walled garden, in direct contact with the public street: the wall builds the house basement. It is developed on an orthogonal axis, through a free arrangement of rooms, from the street to the inside of the plot.

Figure 3. Top. The medina of Kairouan: hierarchy of routes.
Bottom. The medina of Kairouan: reading of the building structure of the khitat [Turchiarulo M. et al., Laboratory of Degree, a.a. 2003/2004, Supervisor: Prof. Carlo Moccia, Polythecnic University of Bari]



The architecture of the Ottoman city is an "architecture of relationships". The internal chaotic image is often in contrast with the perception of the city from a distance, from an outside perspective. Spaces and architecture seem to be jumbled up on top of each other, apparently without any conventionally intelligible order, but linked by a virtual network of visual lines and moving relationships. The relationship with the site's orography makes it possible to understand the underlying logic of the settlement process, which is strictly linked to the character of the place.

As in a forest, in the apparent disorder, everything seems to take place, to regulate itself. (Rosini)

References

Caniggia, G. (1976) *Strutture dello spazio antropico. Studi e note* (Uniedit, Firenze) 187-207.
Cerasi, M. (1984) 'Il tessuto residenziale della città ottomana (secc. XVII-XIX)', in *Storia della città,* vols. 31-32 (Milano), 105-122.
Cerasi, M. (1998) 'The Formation of Ottoman House Types: A Comparative Study in Interaction with Neighboring Cultures', in *Muqarnas XV: An Annual on the Visual Culture of the Islamic World* (Gülru Necipoglu (ed.) Leiden, E.J. Brill) 116-156.
Cerasi, M. (1998) *The Deeper Structures of Ottoman Urban Housing Fabric: Conservation of Space and Form through Basic Parameters*, in Ireland, S. and Bechhoefer, W. (ed.) *The Ottoman house*, Papers from the Amasya symposium, 24-27 September 1996 (British Institute of Archaeology at Ankara, University of Warwick) 9-15.
Cuneo, P. (1986) *Storia dell'urbanistica. Il mondo islamico* (Laterza, Roma-Bari).
De Amicis (2007) E. Costantinopoli (Einaudi, Torino) 16-17.
Desideri, G. (1792) *Strabone. Della geografia, Tomo 1* (Roma Pel Desiderj a S. Antonio de' Portoghesi) 133.
Forster, E.M. and Durrell Lawrence M. (2014) *Alexandria: A History and a Guide* (Tauris Parke Paperbacks, London) xii.
Guidoni, E (1992) *La città dal Medioevo al Rinascimento* (Laterza, Bari) 193-195.
Marcais, G. (1937) *Tunis et Kairouan* (Renouard, H. Laurens, Paris).
Martí Arís, C. (1993) *Le variazioni dell'identità. Il tipo di architettura* (CittàStudi, Torino) 76.
Martí Arís, C. (2007) *La cèntina e l'arco. Pensiero, teoria, progetto in architettura* (Marinotti, Milano) 83-86.
Micara, L. and Petruccioli, A (1986) *Metodologie di analisi degli insediamenti storici nel mondo islamico,* (Istituto Poligrafico e Zecca dello Stato, serie VI) 27-40.
Motta, G. and Pizzigoni, A. and Ravagnati, C. (2006) *L'architettura delle acque e della terra* (FrancoAngeli, Milano) 130.
Petruccioli, A. (2006) 'Amate sponde', in D'Amato C. (ed.) *La Biennale di Venezia. 10ª Mostra internazionale di Architettura. Città di pietra/Cities of stone*, Catalogo della mostra (Marsilio, Venezia) 170-174.
Rosini, R. (1992) 'Metropoli e ambiente. Metafore di città e nuovi paradigmi di città', in Rosini, R. (ed.), *L'urbanistica delle aree metropolitane* (Firenze, Alinea Editrice).
Russo, L. (2001) *La rivoluzione dimenticata. Il pensiero scientifico greco e la scienza moderna* (Feltrinelli, Milano).
Semerani, L. (ed.) (2008) L*a casa. Forma e ragioni dell'abitare* (Milano, Skira).
Turchiarulo, M. et al. (2005) *The medina of Al-Kairawan, Graduate Program in Architecture, Final Workshop* (Polibapress - Arti Grafiche Favia, Bari) 19-33.
Turchiarulo, M. (2012) *Building in "a style". Italian architecture in Alexandria, Egypt. The work of Mario Rossi* (Roma, Gangemi Editore) 334-336.
Turchiarulo, M. (2014) *'Paesaggi di stanze. La forma della casa: il portico e la corte'*, in Ficarelli, L. *Lo spazio domestico mediterraneo. Una casa per il Cairo* (Roma, Gangemi Editore) 23-45.

The problem of subjective individualism in the future of European cities in the 21st century. Dialectic synthesis between urban aisthesis and linguistic-architectural identity

Matteo Ieva
Corso di Laurea in Architettura, Dipartmento dICAR - Politecnico di Bari, Italy
Keywords: organism and urban fabric, organicity, seriality, cultural area, aesthetic

Abstract

The study aims to analyze the constitutive/formative essence of urban systems and European tissues reviewed with a critical, dialectic vision- that tries to find the different character of the built in his being concrete testimony of a "positive eugenics" produced by different cultures.

At the same time, it try to prove the relation link enclosed in the binomial urban aesthetics/architectural identity, as significant character of the individuality of urban bodies, distinguished for geographic-areal fields expressing that complex process of ethnical/cultural/linguistic/social/building osmosis, whose characters set out, in line with the expectations of the civil area, what has been cultural and identity-making brought of the culture that has generated them.

Using some samples of the study identifying the variables and indicative contexts of European realities, as interpretation of linguistic forms meaning different urban aisthesis, research will focus on the contradictory outcome which appears highlighted in this first glimpse of centuries.

In fact, the undoubted architectural distinctions of the pre-modern age, inherent in Mediterranean and North European realities, testifying a concrete form of cultural Objectivism, find in time, especially with modernity, a gradual homogenization which reduces the differences homologating the characters. With this showing an intentional-critical process that push to the side the collective making towards an increasing and unexpected marginality and elects the result "ego" as a paradigm of the being contemporary; tangible evidence of a systemic thinking that interprets reality not through the mediation of heideggerian being o that relates to the world, but rather as a form of individuality that makes use of dialectical mechanisms typical of so-called "age of the technique", proposing the future of reality with a more subjective vision.

Introduction

In the opening at paragraph 1. *Living Architecture*, of his recent critical work *L'architettura come processo. Il mondo plastico murario in divenire, G*. Strappa (Strappa 2014, 23), using a practical realistic vision cleverly permeated by a ontological-symbolic lunge, explains the concept of architecture in a horizon of theoretical research built on the concept of the *becoming* as a synthetic expression of the dialectic relationship between the being-there participatory (heideggerian) and the *being* it enters into relationship with, meaning the way in which man finds, at the same time creator and end user, its realization in reality: "*Every man tends to be architect of the space he lives in: in which it moves, stands, rests. The man who inhabits a place, the man working, praying, playing, loves or defends to survive, organizes around itself a space that changes over time, he adapts, transforms.*

For this, from life and from and its associated motion, it derives the recognizable order of the architecture and of the ordered disposing of the material that gives it the shape: the void, the aerial, the transparent that embrace the motion, find their complement in the full, the solid, the opaque fixity which limits and gives meaning to the spaces".

Such principle that has cognitive validity and to which following consideration make explicit reference, opens a perspective of interpretation of the space built based on the irrefutable proof of the operating history, based on structural mechanics that reads the individuality of the phenomena (territorial, urban, building) as result of distinct spatial and temporal conditions. This indicates, at the beginning of this discussion, a point of view, that analyses and tries to explain the essence of tangible manifestations through a phenomenological systematic with which you first seek above all, the deep causes of the perceptible effects in today's built.

Among the objectives of this research there is indeed interest in studying some typical behaviors, from study samples, through which being able to "read", based on a hermeneutic foundation, the diversity of structural-linguistic result evident in urban systems and in fabrics that characterize the two main geographical and cultural European areas, marked by "linguistic" results representative of an idiomatic conception: "plastic-masonry" that prefers wall building systems, continuous, heavy, plastic, simultaneously bearing and enclosing; "elastic-wooden" denoting an expressive way of realization of wooden construction systems, discrete, light, elastic, bearing and not enclosing.

The clarification of the identity of each architectural culture, is able to explain the composite appearance characterizing the structure and the facies visible by many urban contexts. Which denote concretely a substantial difference "plastic" (Strappa, 2014) -such as the existence of permanent identity characters describing the common features of anthropic organisms of "area"- interpreted as an expression of a aisthesis (of buildings, of urban fabrics, of the city) which can be explained by the aid of a judgement founded on the search for the "link" and "correlation" established between the "being" of the structured reality, and therefore between humans and man-made space.

Within this framework of evaluation arises immediately a significant structural differences between the answer (to questions of method) provided by pre-modern and modern architecture essentially unitary and collective, composite at the same time, compared to the substantial problematic of the contemporary conception, often pervaded by unbalanced phenomenal on values that seek an individual perspective supported by a "creative" vision and together synthetic-intuitive.

Consequently, considered the heterogeneity of the elements that contribute to define the various contexts examined over time, the structure of the proposed analysis will give a framework of evaluative variables, supported by a thought that openly accepts the doubt in the form of method.

Founding reflection on the systematic questioning-doubtful we are sure that opening focus on consistent issues with the premise of the argument can be used to build a grid of questions consistent with their expectations of reasoning. And questions, as is known, represent the immanent critique in a thought (in this case) only stated, which is waiting for answers.

Linguistic identity in characters of pre-modern European architecture

The problem which arises at this point of the speech concerns the possibility of defining the concept of architectural identity, avoiding pure abstractions and distinctly identifying its being concrete expression, of a civilization that has historically determined it. Without encroaching on the field of disciplines that wonder about the interpretative differences of the notion, here just to emphasize that to admit the evidence of identity of a set of building structures within our ontological repertoire you must first reflect on the way they are, even partly, accessible in epistemic way. This means that their existence can be explained only through the possibility they come someway in cognitive connection with us who affirm the existence. From which follows, in order of re-knowledge of a subject-object correlation relationship, the identification of elements that define the *identitas*, transposed both logical form by means of "common sense", either through a historical-processual practice (scientific), also based on semantic and cognitive considerations synthetically within an assumption of method based on those concepts that lead to recognize the "aesthetic" character. Including without any doubt concepts of type (synthesis *a priori*) and organism (synthesis *of ratio utilitatis, ratio firmitatis, ratio venustatis*) assumes particular importance.

The recognition of common characters to building types, aggregative and urban outlines a "truth value" determined by analytical data derived from a broad and articulated framework referable to reality built in its temporal and historical continuity. From this point of view, the identity can be understood as the recognition of those connotative qualities, constant and repeatable, taken as value, testifying the essence of the built attributable to a architectural culture.

Hence the need to use just an analytical method based on the foundations of knowledge that enables us to identify these characters, identified in their being co-essential, frequent and communicable, to describe the differences (of types and organisms) that qualify the cultural context in which they are direct expression.

Interpreted as concurrent *being*, and not red only based on their "formal" (apparent) outcome, they are studied in internal reports referring to the complex of "universal correlations" that characterize them, both as objects themselves and in correspondence with other objects to which they are connected to. Their structural-procedural mutability, easily identifiable recalling mechanics of "becoming" defining the diachronic and diatopic variations related to differentiated civilian contexts, suggests that also architecture, similarly to any linguistic entity, has a result of community type whose distinctive characteristics of an architectonic way ("spoken" and "written") that is collective by its nature.

The study of the langue present in European contexts, constitutive synthesis of the many idiomatic-identity characters gives evidence of distinctions that characterize the main cultural areas -meaning the physiognomy and structure of the cities included in its area of interest- that, exposing a plausible and shared synthesis can generally identify themselves, as indicated, in the one plastic-masonry, expressive of the Mediterranean spirit that reveals a character of "plastic" organicity, and the one elastic-wooden, recognizable in Central European and Northern European areas, whose peculiar marks are the serialism and the structural transience.

With clearly more marked differences in geographically opposite places and a greater affinity and correspondence in middle areas, but even with that fundamental condition of hybridization, as export/import phenomenon, which has enriched the heterogeneous cultural heritages and where the autochthonous has found the needed renovation through the renovation.

Cultural areas as interpretation of architectural and urban aisthesis

Both linguistic forms, meaning ***αἴσθησεις*** architectural and urban variables in relation to specific cultural identity in every place, are expression of the procedural developments and find different individualized outcomes that must be interpreted with general parameters, and possibly shared and documented, although not universal.

The structural problems of the topic, which we are not going to develop in this study, is

already implicit in the word "aesthetic", whose etymology simultaneously recalls the *sensation, perception*, the *ability to feel*, the *sensitivity*, manifesting a range of interpretive horizons, evoking visions at once subjective and inter-subjective, which have long stimulated the reflection in many disciplinary sectors, and among these in particular philosophy.

Within a framework of assessments that are recognized to be specific in the architecture world, so that we can come to understand the aesthetic *essence* of the city, it seems necessary to critically ponder on its constitution and on the historical process starting from the assumption that it is the visible result, the sensible *semblance* of an urban and architectural *idea*. Consideration that stimulates, evidently, the interest to relate the *aesthetic* dimension, seen in techno- practical optic that incorporates the ideal of *pulchrum* as expressivity figurative and structural, to the *ethical* entity, deeply manifest of the "way of being" in reality and of the expressing collective behaviors.

Thus overlooking the concept of *aesthetics experience* that searches beauty like something real (the *verum* taken by will) and good (*bonum* taken from the intellect), we can say that architecture, not seen as a mere object of contemplation, acquires a general meaning entirely different offering itself consciously to the accidentality of the world and to the temporality that defines its concrete existence, putting under a single judgment just aesthetic and ethical components that also incorporate anthropological, social, political meanings, etc.

With this approach, one accepts the close relationship with the theoretical vision for wich architecture, as a concrete manifestation of the reality, should be seen as "experience of truth" according to the meaning proposed by H.G. Gadamer. Because if it is true that man, wherever it acts, builds his space giving it an "aesthetic sense" recognizable over time, it is also proved that appearing sensitive of a context (urban for example) as life experience, determines a recall in the way you "see" the reality, which corresponds to an imprinting that ends up by changing the perspective of participation from the construction point of view of that world. In such dialectic is present the heideggerian concept according to which the artwork (in this case, as pointed out by S. Muratori and M. Romano, is the entire historical city) has a foundational and inaugural value being "opening of a world". Consider, for example, the general aesthetics separated into cultural areas, but also to the urban one, well-marked in urban places (by some) as Venice, Florence, Rome, Paris, Madrid, Brussels, Amsterdam, Budapest, etc. which resulted in a way of perceiving and building reality based on a specific character, a language, semantic and experiential values. And not only in those that have actually designed and lived that reality, given that often the aesthetics has spread beyond its cultural boundaries determining the linguistic and architectonic contamination, source of wealth and progress.

In this theoretical assessment framework, which tries to deal with the meaning of aesthetics in architecture, is not for sure stranger to that subjective component that has somehow marked the aesthetic outcome of cities. Individuality of the author in which you recognize the peculiar qualities that go, however logically, relate to a collective way of doing that is expressed in a context, a cultural milieu in which the results of his work have to do with the achievements and the results so far achieved. Where in addition to individuality other factors come to play, as the different visions of many others who contribute and participate in the event and the reality with its specific structural essence. In this talk is recognizable a point of view recognize that searches for the ontological value of the individual artwork, the way of being from which, according to G. Vattimo describing Pareyson's thought, derives that the opinion that «... *occurs the establishing of a model of world, in which the author certainly is, invents it but inventing encounters also something even denser* ... ».

From these considerations, although general, we note that, the aesthetic judgment, not contemplative and not exclusively attributable to a purely logical concept and to "taste", finds its own dimension in tangible concreteness of reality constructed, placed precisely in the transmissibility of "sensus communis" and kept in the transcendental condition of "intersubjective" relationship (with a foreword of search for truth which uses shared items), as undeniable pre-condition of "universal subjectivity".

Speculation by some Italian architects have been focused on these (and many other) concepts (among the most vital research we remember in particular the critical works

of G. Giovannoni, S. Muratori, E. N. Rogers, L. Quaroni, E. Persico, A. Rossi, G. Caniggia, V. Gregotti, F. Purini, G. Grassi, G. Strappa, G. Arcidiacono, M. Romano) they have questioned the choice of criteria-values preferable for the construction of an aesthetic judgment based on the real evidence of architectural and urban outcomes.

To demonstrate it we synthetically propose, as an example of critical compared reading, the case of the Maltese archipelago architecture and the one of the geographical boundary of Wallonia where the city of Liège lies. In-depth case studies with Final workshop of degree coordinated by who is writing and documented in pictures.

The architectural language that appears in the Maltese Islands, culturally akin to lexical systems of South Italy, although heavily hybridized due to the uninterrupted contamination that was subjected to for geographic reasons, shows a character of the built which translates itself in the strong opacity of the walls, in the unity of urban fronts, in deep organicity of the fabrics that make up the urban organism. Places where coexist simultaneously various types, extensively affected by the hybridization produced with the arrival in the 16th century the Knights of St. John, identifiable in the mutability of ingredients readable on the façades, which, unmistakable, express the organic and layered character typically tectonic-wall of the construction, few permeable and consistent with the construction phase but also with the specialization.

Organicity found at the same time in the hierarchical qualification of the paths, ordering the structure of building aggregates and squares, always polarized and highly unitary, confirmed by the presence of specialized buildings. The ancient Mdina and Victoria, then Birgu, Senglea and especially La Valletta, foundation city that accommodates the Knights, show the autochthonous language essence in the evidence of the character of masonry curtain of globigerina (Maltese stone), emblematic expression of the Maltese architectural "spoken". Physiognomy captured by the insular built of the archipelago, prior to the update (interesting, although not without contradictions) proposed by the British, is in fact typical of the Mediterranean context and declares the character of architectural language common in a territorial area wider than Malta alone, distinct and recognizable here according to its own idiolect.

Otherwise, North European and Central European realities have in common a lexicon consisting of linguistic morphemes proving an identity focused on grammar and the "sun taxis" of urban and architectural forms characterized by a principle of serialism, as iteration of repeatable elements, and transience, expressing an inherent condition of the temporary ephemeral hold determined by the continuous, as sometimes necessary, renewal of structures, buildings, aggregates.

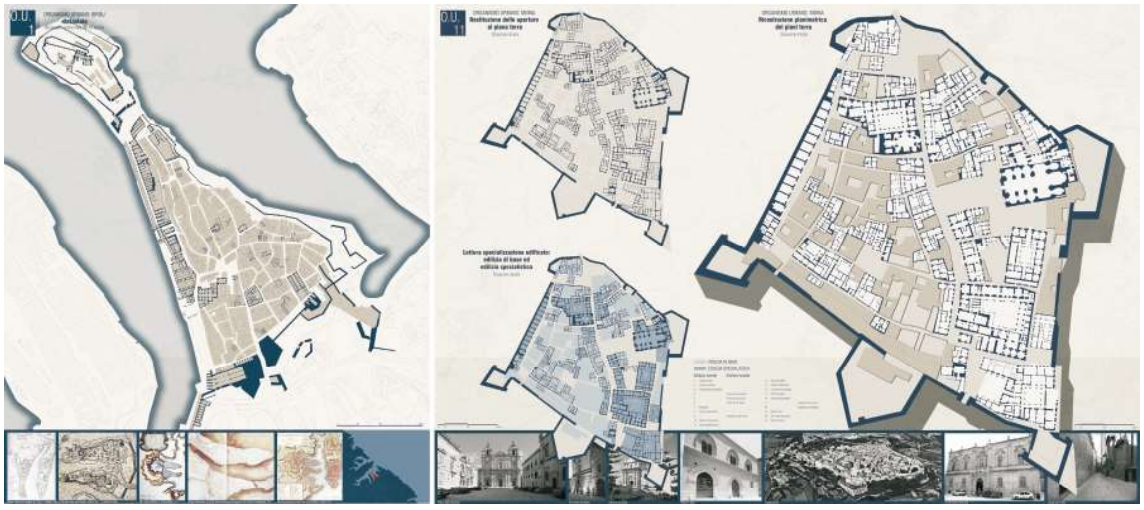


Figure 1. Malta: Birgu and Mdina, ancient capital of the island. The urban structure and the architectures openly declare the organic character typical of the Mediterranean cultural area

The cultural limit of Wallonia openly shows such characters that are welded only from the Carolingian age and that will mark the beginning of identity result appropriate to the serial-typical "glossary" of the Netherlands. The singular incident of the birth in Liege of eight major collegiate churches in the 10th century and the consequent formation (linear) of the fabrics, relates to the phenomenon of absence of squares, places qualified to accept collective activities, in the traditional meaning known in other European contexts, (maybe) just because of the great clerical structures.

Distinctive feature, which shows just the serial essence of many cities of this geographical boundary, noted for example in the formation of the mature structure of the urban fabrics that hardly reach the configuration in blocks, since the linear solution remains in the subdivided paths with row houses building types, houses of canonicals and, later, hôtel particulier and in-line houses. Also the system of urban hierarchies is influenced by morphology of aggregates, while the wooden constructive character, exemplary timber framed houses, remains firmly although the covering and the supporting structure will evolve gradually in brick masonry. The same cathedrals, many of them born in Romanic and Gothic age, confirm the area's own cultural idioms, transferred in discrete systems, carrying and not enclosing in which the wide diaphanous surfaces shells show a unique "sense" of balance, lightness, transparency.

The consolidated image of the building "wings", totally permeable building with very tight and dense interaxis, expresses that distinctive mark of built that does not change even in the urban pole of the square. Therefore, an architectural and urban aesthetics stating the linguistic identity evolved in that vast Northern European territory who comes to enhance the cultural expectations of the civilizations that have stratified.

The limited consideration proposed here allow to discover the city (in both cultural contexts) and its expressive significance, revealed by the urban "form" as unitary synthesis of components that interact simultaneously, as "sediment content" that -paraphrasing T.L.W. Adorno (Adorno, 1975) brings a "content of truth" namely an immanent historicity.

This general interpretation glimmer is, obviously, in a sphere of judgment that captures the interest to consider the "perception", as ability "to listen", in an epistemic context aimed to establish a deep link between the historical fact and the actuality of the message that (the city) is still able to convey.

It is precisely these conditions, combined with the sensorial fact, allowing identifying

Figure 2. Vallonia: settlements of the Mosa valley. The structure of the urban fabrics shows the serial character of the systems typical of northern Europe

the laws and general characters, extensible in architecture to every concrete expression of civilization, they let understand that invoked "common sense", according to G. Gadamer, «*approaches the historicity of a place and its aesthetics reviving with a modernity making it actual in any current time*».

Yet, even with large approximation, we can assume that the stability of the pre-modern city character, which helps nurture a certain conservative identity distinct locally and diachronically renewed, consumes progressively starting from the transition to the romantic period, causing an overall sense and meaning transmutation of those connotative values, that in time, identified the distinctive marks.

From the localized language, specific of urban realities belonging to the two cultural contexts, we reach in the 19th century an embryonic form of internationalization. With Neoclassicism, which ushers in a coded language in architectural style, a perspective opens that for the first time reduces the localized language differences in favor of a vaguely "esperantistic" conception.

Now arises to our attention a different question: what meaning the concept of aisthesis acquires during the transition phase to modernity that critically assumes, even if only in part, what brought inherited as announcer of an unquestionable truth content?

Modernity criticism vs. linguistic contradictions and subjective individualism in contemporary life. Conclusions

With modernity is, in fact, still present the interest to preserve the relationship with a historicity that binds past and future, even in the apparent contradiction that leads to integrally delete the "styles" of previous neoclassical phase.

The architectural language consolidated in cultural areas, dormant because of the generalized use of 19th century stylistic idioms, comes back to life again with a whole new meaning jauntily permeated by a mediating critical principle expressed, by the individuality of the authors. To the point that the thought of some leading figures, both Italian and from beyond the Alps, will mark the beginning of a new way of interpreting belonging to a linguistic context, making their work become, sometimes proposed as manifesto, expressive image of modern architecture.

It will be primarily the interpretation of organicity, typical of a Mediterranean (Italian) building and urban still vital where – writes G. Strappa (Strappa, 2004, 135)- «... *with the same constructive gesture the architect solves the static and distributive problem expressing it in aesthetic synthesis*» (see, in this regard, the works of M. Piacentini, A, Libera, G. Muzio, S. Muratori, L. Quaroni, M. De Renzi , G. Terragni, L. Moretti, M. Ridolfi and many others), which will establish the distinctive feature denoting a profound difference from the ideology of the greatest interpreters of the transition to modern in Central and Northern Europe. Which come to re-read the serial character enhanced by use of the discrete system framed in reinforced concrete that translated the character of "wooden" in a coherent form to the autochthonous culture result. Significant testimony are works by many authors (e.g. A. Perret, Le Corbusier, W. Gropius, L. Mies Van der Rohe, A. Aalto, etc.), despite in the deep interpretative diversity of use of cement-based material both in the form of *elastic system*, and *building use*.

Large emphasize to the theme appears in the first paragraphs of quoted volume of G. Strappa that studies the spatial diversity.

And although with large approximation, we can think that the aesthetics of the modern city, although stressed by numerous attempts to contamination of autochthony, generated by a continuous tension permeated by the so-called International Style forms, firmly retains its linguistic character until, with the appearance of new avant-garde's that make their way in the second half of the last century, concurrently to the diffusion in architecture of cultural "models" expressing a new globalizing and planetary phenomenal, the tendency to suppress the identifying differences and then consider discontinuous the relationship among urban authorities. On top of that, once assumed the "technique" as a paradigm of technical-scientific truth, architecture has gradually lost the traditional ethical and humanist devices that were the foundation of cultural and linguistic values as principle of cultural

Figure 3. Project in the island of Malta: the "sewn-up" in the Ta Xbiex peninsula and the redevelopment of Manoel Island. The organicity and the linguistic unitary of the whole represent the main "paradigms" on which critical reflection was based. The opaque walls of buildings, made of Globigerina stone, interpret the typical massiveness of the Maltese building

identity. The structural condition of inadequacy to the response that leads to the misunderstanding of not feeling, for example, part of a *civitas* that lives and recognize the urban *being* as "community" system, seems to grow those contradictions highlighted more than a century ago in a prophetic essay of G. Simmel (Simmel, 1995) describing the criticality of metropolis, as the place of conflicts and confusion of human relationships.

Because of the spread of such criticism the opinion arises, in many interpreters of urban dynamics, which the saving action can basically come from a completely individual "creative" action. Vision that, in fact, opens to form of dominant *subjective individualism* no longer representative of the linguistic-architectural result of a culture.

The new categories on which research is based, sometimes varying between transcendental parameters and pseudo-logical and rational semantics, seem to promote an urban unconscious in which the space is devoid of identifiable relations being often sought the variability, the opposition, the heterogeneity, the discontinuity.

De-territorialisation, a-topia, hetero-topia, non-place, porosity, transarchitecture (or liquid architecture as a new form of a semantics of non-space), but also: *sustainability, smart city,*

resilience, become, all, expressive models of contemporary deeply pervaded by a condition in which the "future" appears increasingly dominated by the act of few personalities, which become the protagonists of a new *aisthesis*, antithetical to the previous vision being built on a form of subjective solipsism. In this context of considerations far from meaningless trend appears to chase the paradigm of the so-called *new international style*, which ended up definitively to squander the linguistic- architectonic identity that had been, until the pre-modernity, the value of truth on which the aesthetics of the city was based.

This new "cogitative" dimension manifests another critical phenomenon denoting the renunciation of that deep, as necessary, sense of ethic, characteristic of consumed collective result. Browsing then horizons of research contradictory among themselves, articulated in schizophrenic paths towards the idea of the formidable project that sinks, many times, in the anguish of failure because the result does not take the aimed size.

Beside what has been said, and overlooking those positions that allegedly deny the ontological conception, it seems somehow hard to understand which horizon of reflection can be offered, especially when looking for a system of exclusive concepts that may be useful "indexes" (including transcendental) to which attempting a critical re-reading of the phenomena, especially in view of the resurgence of a new *aesthesis* which does not deny the areal linguistic result. Therefore, not the speculative abstraction but the *ontic* vision that search the things in relation to their particular existence "in what They are for what They are", looking to be a different theoretical position outlining an idea

Figure 4. Project in Liege: fulfil of the urban fabric in the Outremeuse district. The serial structure of redesigned blocks recover fully the aggregative laws of the consolidated city by proposing the necessary update. The building organisms find in the discrete system of concrete structure bearing, not locking and in transparent envelopes, the necessary relationship with the aisthesis, typical of the cultural area

of architecture with which try to build a *space of identity*, however appropriate to that condition of necessary contamination, which makes spatial boundaries even more fluid without sacrificing the cultural *essence*.

Nurturing, perhaps, the concrete hope to arrive to a hypothesis of updating contrary to the identity nihilism we can conquer, in other words, a different conception based on a form of *critical internationalism* that can preserve the local lexicological distinctions but also to recognize evidence of an architecture inspired to a *new "language"* of European matrix, in which the experiments come to remoulade to a more a more extended border which tends to hybridize, but not cancel, the differences.

Promoting, thus, the future of reality through the deep connection that is established between our Machenschaft, our being effective and proactive transforming the future, and those ethical and aesthetic components that define, in the field of architecture, our concrete existence.

Trying, in other words, the ontological range, our way of being in relationship with others and with the world of research of an urban aesthetic that can express itself in a foundational and inaugural capacity completely new: "by opening a world" that recognizes the unity (of architectural language), despite the multiplicity of and outcomes and in a dialectically intersubjective vision, inalienable prerogative of any linguistic entity.

Pictures of thesis designs on Malta and Liège, proposed here, expose a personal and critical vision of the concept of linguistic and architectural upgrade in the two different cultural contexts.

References

Cacciari, M. (2009) *La città* (Rimini).
Calvino, I. (1996) *Le città invisibili* (Mondadori, Milano).
Caniggia, G. Maffei, G.L. (1984) *Il progetto nell'edilizia di base* (Marsilio, Venezia).
Caniggia, G. (1997) *Ragionamenti di tipologia. Operatività della tipologia processuale in architettura*, a cura di G.L. Maffei (Alinea Editrice, Firenze).
Carlotti P. (2014), "Identità mediterranee tra architettura e paesaggio" in Carlotti P., Nencini D., Posocco P., a cura di, *Mediterranei. Traduzioni della modernità* FrancoAngeli Editore, Milano
Gadamer H. G. *Il cammino della filosofia. Hegel l'estetica* (http://www.emsf.rai.it/gadamer/interviste/21_estetica/heg-estetica.htm).
Cuomo, A. (2013) *La città infinita* (Melfi).
Gregotti, V. (2006) *L'architettura nell'epoca dell'incessante* (Bari).
Hegel, F.G.W. (1997) *Estetica*, trad. it. Merker N. (Einaudi, Torino).
Heidegger, M. (2001) *Verità e metodo,* trad. it. Vattimo G. (Bompiani, Milano).
Ieva, M., (2013) *The city structure in time and the "a priori" form of new urban configurations*, in International Conference on Changing Cities Spatial, morphological, formal & socio-economic dimensions, (a cura di) Aspa Gospodini, proceedings, pp. 912-921.
Muratori, S. (1963) *Architettura e civiltà in crisi* (C.S.S.U.).
Purini, F. (2008) *La misura italiana dell'architettura* (Bari).
Quaroni, L. (1974) *La torre di Babele* (Marsilio, Padova).
Romano, M. (1993) *L'estetica della città europea. Forme e immagini* (Einaudi, Torino).
Romano, M. (2008) *La città come opera d'arte* (Einaudi, Torino).
Rossi, A. (1978) *L'architettura della città* (Milano).
Severino, E. (2006) *La filosofia futura. Oltre il dominio del divenire* (Milano).
Simmel, G. (1995) *Le metropoli e la vita dello spirito*, trad. it. di Jedlowski P. e Siebert R. (Armando Armando, Roma).
Strappa, G. (1995) *Unità dell'organismo architettonico* (Edizioni Dedalo, Bari).
Strappa, G. (2014) *L'architettura come processo. Il mondo plastico murario in divenire* (Franco Angeli, Milano).
Vattimo, G. (2012) *L'arte e la sua verità* (https://www.youtube.com/watch?v=3rWZu3rECjg) accessed 6 August 2012.

Clustering Places

Glen Wash Ivanovic
Department of Architecture, Xi'an Jiaotong Liverpool University, China.
Keywords: Place-theory, data visualization, urban morphology

Abstract

The concept of place is one of the many unclear complexities which arise when we study our relationship with the built environment, and no ultimate definition can be found for it. Instead, the many available distinctions are coming from a variety of fields, generally reinforcing the idea that place is not a purely spatial phenomenon, or perhaps has been relegated to a concept on which we can theorize about but not much else can be done. While a given place is experienced differently by each individual (individual scheme of a place), this paper argues that there is also a "common scheme of a place" and proposes a methodology for identifying and measuring the concrete components that take part in creating this common scheme, so these components could be quantified and geographically represented. The methodology was tested through a case study in Ueno Park, Tokyo, where it was possible to create a place-database of the park. Later, by using cluster analysis and hierarchical dendrograms we were able to generate maps of the park showing the different levels of linkage between its places. The conclusions indicate that some aspects of the concept of place can be objectively understood and geographically represented, and this information has the potential for being incorporated as a concrete coordinate for architectural and urban design.

Introduction

The concept of place is not a controversial one. This is not due to a lack of complexity or relevance for the academic (or any other) discussion, but because of how deeply is related to us and the way we conceive existence. Because of how present, fundamental and, at the same time, permissive it is. In a general sense, place *allows* rather than *restricts*, therefore the concept is usually taken for granted, regardless that the word is always present in the urban and architectonic discourse. Nevertheless, it is precisely because of the permissiveness of the concept that a steady but subtle discussion has been evolving during centuries, accumulating attempts to define it which comes from a number of disciplines and directions. If place can be understood as human experienced space (Casey, 1997), this does not make things any easier, suggesting that place is a concept on which we can theorize about, but not much else can be done. What we find when studying the place are a number of ideologies but a lack a methodologies. Place-theories are usually focused on issues like history, function, character and space, all which are indeed connected to the concept, but there is a lack of methodologies for studying the edge between space (concrete figure-ground relationship) and place. Can places be partially objectified and measured? Can essential qualities of a place be mapped and geographically represented? In this research we propose a methodology for doing this, stating that, while there are certain aspects of a place which are unique for every individual (individual scheme of a place) there are all also qualities in places which are recognizable to us all (common scheme of a place) and these can be indeed measured, mapped and shared.

Methodology: measuring the common scheme of a place

The hypothesis of this research is that, while place is a total phenomenon that can have as many meanings as observers interacting with it, there is still a common structure for it. This common structure of the place is the result of components which altogether constitute the common scheme of a place. So, in theory, by measuring these components, a place could be then quantified and graphically represented. Underneath this hypothesis runs a parallel statement, which is that a place can be partially objectified. A place will manifest differently for each observer, yet the components which compose the place's structure, making this variety of manifestations possible, are the same for every observer, which means that the research is aiming to find the components of a place which can be considered concrete, objective phenomena. This raised another problem, because if we are studying the place only from its material features, how is this common place any different from space? If a place is deprived of any subjective meaning are not we dealing with pure space which can be registered, studied and represented as architecture has always done? We argue that the methodology here presented not only defines which ones are the components of the common structure of the place, but also how these components ought to be recorded if we want to capture features which correspond to the place rather than the space. The axiom used for both the boundary definition of a place, and the registration and quantification of its components, is that everything has to be done from a perceptual perspective while being on a specific place. The research states that by following these criteria it is possible to capture features and characteristics which belong to the place rather than only to space. The components of the common scheme of the place are three; space elements, visual scenery and activity. The definition of these components and a methodology to measure each one of them is explained in following chapters. However, it is crucial first to find a place where to undertake a case study and test the proposed methodologies.

Case study: Ueno Park

For the case study we decided to test the methodology in Ueno Park, Tokyo (Ueno Onshi Kōen, 上野恩賜公園) located in Taitō ward, to the northeast of the Imperial palace.

It is the first public park in Tokyo and the most popular one in terms of number of visitors. The main reason why we decided to carry out the case study in a park was because it poses an undemanding and flexible environment, in which the location, duration and range of activities carried out by the visitors were more related to personal choice rather than the constrains and limitation of a fully shaped urban environment. While the differences between parks and urban environments are evident in every city, in Tokyo these differences are accentuated by their morphology: the spatial contrast between Tokyo's dense urban fabric and the openness of some of its big parks (like Yoyogi Park, Shinjuku Gardens or the mentioned Ueno Park) is quite marked, and despite the dramatic and numerous changes occurring in the city since the Meiji period the outline of Ueno Park has barely been altered. Instead, the park is filled with areas and places which belong to different historical periods and events. This gives the impression of a park made up from different patches, apparently disconnected from each other, yet it has managed to retain integrity as a place. These parts and patches can be considered not only as partitions in the space, but as a network of sub-places which needed to be properly identified. This required a consistent methodology for identifying each sub-place. There are several difficulties when defining the boundaries of a given place. One of the problems is the complexity and openness of a concept which can be equally used for referring to the moon or under a table: they are both places. All places can eventually be subdivided into smaller places, but they cannot be smaller than a human body. If we consider the human body as the basic unit for measuring a place, then we could agree that Ueno Park is made off as many places as people being in it. Since it will be impossible to know every sub-place that manifest in the mind of each person who visits the park, we needed to focus on finding a methodology for identifying a common network of sub-places. This network may not be specific to an individual, but every individual would agree with it. In order to identify this common network of sub-places we used Lynch's "image of the city" methodology (1960). Ueno Park has a strong urban character; it appears as a portion of the city where the buildings have been replaced by trees, so regardless that Lynch's methodology was first intended to be used in fully urban environments it adapted to Ueno Park with ease, providing a starting point for identifying the sub-places. However, we realized that this methodology by itself was not enough because it does not considers the concept of boundary, and to distinguish a boundary is perhaps the most essential operation for place definition. In Ueno Park, the notion of leaving a sub-place and entering another one is given by subtle, yet perceivable changes in the space, allowing us to make distinctions and divisions to the park even if we are not fully acquainted with its totality. In the city, the interaction between solids and voids are an unmistakable distinction between spaces, while in the park the natural elements have a degree of permeability of light, sounds and smells, so that the level of enclosure that the trees produce is not as severe as those produced by the solid man-made elements. Moreover, the man-made elements encountered in the park are not radical interventions to the space like walls, buildings and streets but they are mostly a guide, a suggestion to the space that provides a level of flexibility in the way we move and stay. We investigated all the elements and instances capable of creating a boundary, which allowed us to perform the subdivision by experiencing the boundaries in the same way in which a regular visitor in the park would do it. We started the subdivision of the park with only one rule: no sub-places could be fully contained by another one. This resulted in a network of 33 sub-places manageable for a person to properly perform the data collection.

First component: space elements

When in the city, we are able to recognize features in our environment. Some of those features are related to character and identification, and others are related to the definition of boundaries, the limits between places. This ability to read our environment is not instinctive but explained by the fact that these elements have qualities and characteristics that allow us to recognize them as unique entities. In Ueno Park, these elements range between space defining elements (like pavements, fences or curbs) to activity elements

(benches, luminary and signs). In order to quantify and categorize them, it was necessary to elaborate a catalogue of the elements in each one of the sub-places, and register them in the way we all perceive them. This was done by using simple on-site observation, marking the locations of the elements as accurately as possible in relation to the rest of the elements and features that could be found in each one of the 33 sub-places of the park. It is necessary to clarify that some elements could be classified not only by category but also by type. For example, the category layout/pavement comprises a variety 25 different types of asphalts and surfaces found in the park, so every type of pavement was indicated for each sub-place in which they were found. Other elements are unique, like various sculptures scattered in several sub-places. They cannot be classified as a type, but they made a category. Also, elements like benches or signs can be counted, so their location and quantity was recorded. Other elements like fences or pavement could not be counted as units, so instead we indicated only if they were present in a certain sub-place, plus their type. Also, every element and type was recorded using pictures so their formal characteristics such as shape and color were also registered. Once this information was collected it was possible to make a file for each one of the sub-places which contains all the elements found in them, where these elements are located and how do they look like (fig.1). Hence, we were able to produce an elements database which contained 12 categories of elements and 84 types, all of them assigned to their correspondent sub-places.

Second component: visual scenery

Although some places can be very similar, every place is unique. Two places can have the same size, materials and elements, and be located just right next to each other in a symmetric, mirrored position, but obviously their location in the space can never be the same. Therefore the relationship of each place with the rest of the world that surrounds them is unique. When we are in a place we experience a perceptual field that can be seen only by being in that place, and this perceptual field is as defining of that place as the materials and elements from which it is made of. When we are reading our surroundings, we use all of our senses, but vision is by far the most compelling one for perceiving space, and it is also the most complex one. For recording the visual scenery of a

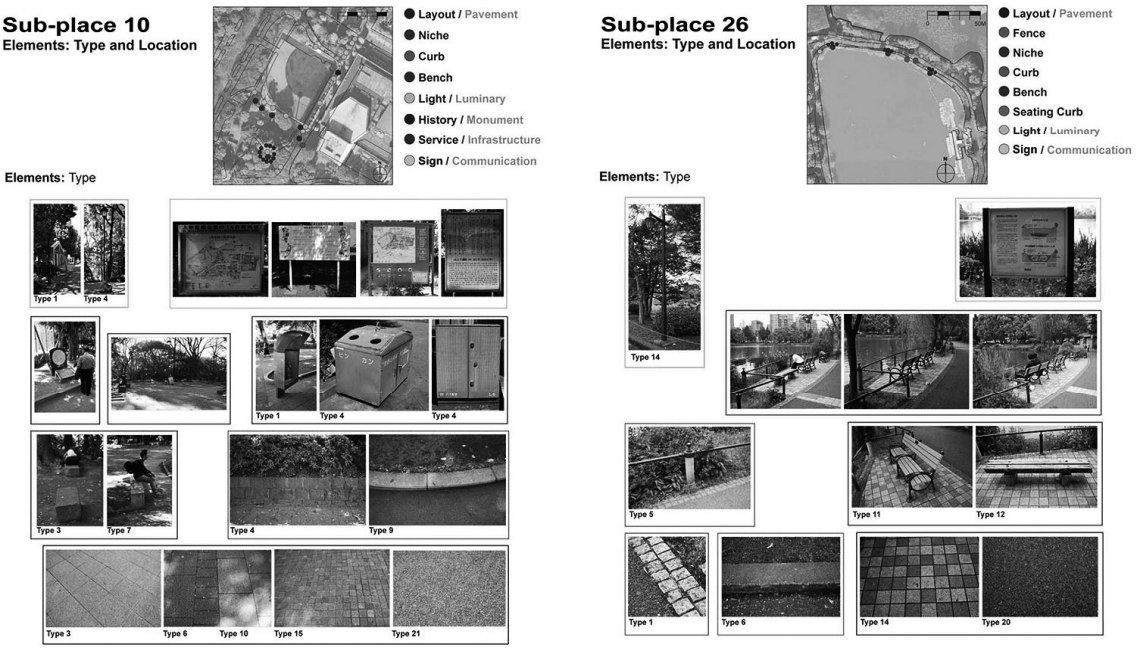


Figure 1. Elements registered in two sample sub-places

place we needed to define two things. First, it was necessary to find a way of framing and capturing the scenery of each one of the 33 sub-places of the park, and second, this way of framing the visual scenery had to be done from a perceptual perspective in order to get as close as possible to the common visual scenery of a place. In order to do this we proposed a methodology called Visual Scenery Information, and consists in recording the average scene in each one of the sub-places by taking 360 degrees pictures from a central location within them, and then turning those images into quantitative information representing different categories of visual scenery (like sky, vegetation, religious buildings, etc.) by segmenting the images into pixel areas for each one of these categories. All pictures were taken using a focal length of 22mm, which is the most likely focal length for the human eye (Phys. 531, 2007). Of course, this does not mean that the camera is recording the scenario just like the human eye would do. Visual perception is a field on its own and there is still great debate in defining how we actually perceive space visually (Bouwhuis et al, 1987). However, it would not be inaccurate to say that the scenery which the camera can register using the proposed focal length would also be perceived by the human eye in more or less the same proportions. The resulting images were then segmented in different layers and colored into categories, which allowed us to calculate the numbers of pixels in each layer, hence the numbers of pixels per category (fig.2). It is important to point out that what matters for the methodology is not the actual number of pixels of each category, but the proportion between then within the panoramas. This is what makes the comparison of scenery between sub-places possible. After the panoramas were segmented we were able to quantify 11 categories of visual scenery in the sub-places of the park, adding not only more variables to the database, but also revealing that certain qualitative characteristics of the sub-places could be translated into more or less quantities of pixels. For instance, places with less proportion of sky category also showed higher threes category, evincing that this places had a higher level of enclosure, enabling us to see more information than expected.

Third component: intensity of activity

To incorporate activity as a quantified component for each one of the 33 sub-places of the park was perhaps the most difficult task for the research due to the blurry distinction between different categories of activity. From Gehl's (1987) defined categories of activities (necessary, optional and social activities), optional activities are the ones most related with place-making in open public spaces. This does not mean that necessary activities and social activities should not be taken into account when studying the park. These three categories of activities interact with each other in most of the spaces in the city, including private spaces. For example, if I am having a coffee in the terrace of a coffee shop, I am enjoying an optional activity which I probably chose to do, yet the waitress serving my coffee is carrying out a necessary activity under the same space and

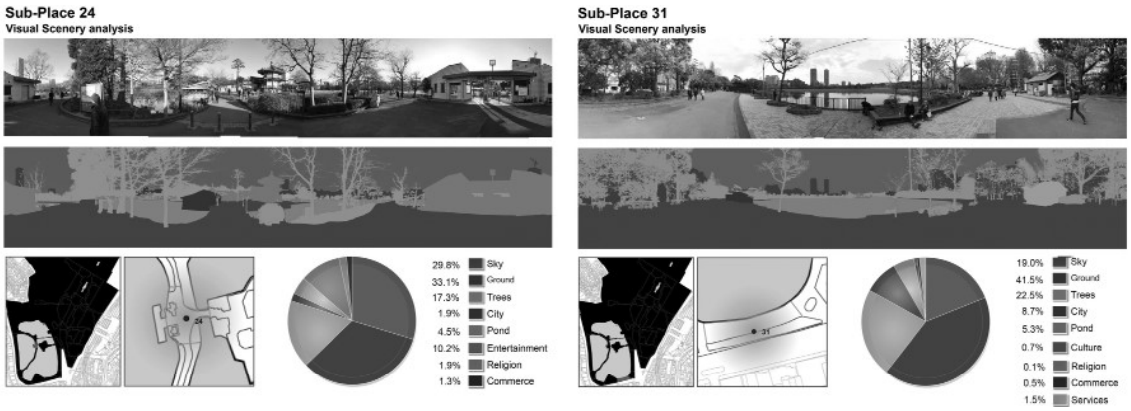


Figure 2. Image segmentation of Visual Scenery for two sample sub-places

premise. My interaction with the waitress and the cashier is a social activity in the later, but a necessary activity in the early: a requirement for me to enjoy the optional activity that I had chosen to do. The same situation occurs in Ueno Park. While some activities can be easily classified into one of the categories previously described, some activities are more difficult to define. For example, if I decided to enjoy the performance of a street artist, for me and the rest of the public this will probably be an optional activity, but for the artist this is unclear. If this is how the artist makes a living this should be classified as a necessary activity, but if this is something that the artist decided to do in his/her spare time only for the joy of it then it is an optional activity. It is impossible to know all the motivations for the people in the park or why they do what they are doing. This is not an observable phenomenon. However, all the different specific activities which happen in the park can be comprised by two more general activities: to stay and to pass by. By measuring these two activities we can obtain a number that represents the amount of people being in a sub-place, and will allow us to quantify the intensity of activity in the park. We found available data about the number of people visiting the park but it was focused in recording the amount of people entering the premises of the park, not in their distribution. Since ne needed to measure the intensity of occupation for each one of the sub-places it was necessary to perform our own counting of people.

The counting was performed during one single day, simultaneously in each one of the 33 sub-places. We decided that the counting would be done from 10:00AM to 17:00PM, since we obserced that before 10:00AM the level of activity was not significant and after 17:00PM the level of activity decreased notoriously, in accordance to the same period of time in which most of facilities in the park are open to the public. Another requirement was that the day in which the counting would be executed had to be a weekday, because during weekends the park is visited by great numbers of people, making the counting more difficult and potentially less accurate.

The counting was carried out as planned. We collected samples of ten minutes per every hour. This time periods for counting people occupying public spaces have been proven consistent in providing reliable samples, especially for data extrapolation (Gehl et al, 2006). During the ten minutes samples we counted everybody who was inside the boundaries of a given sub-place, regardless of their age, gender or activity. The volunteers who performed the counting were encouraged to do their best not to recount an individual during a single sample, but if an individual could be found staying in a place during more than one sample, he had to be included in it. In other words, everybody being in a place during the counting time was included in the sample. The results allowed us to add 7 more variables to the place-database (number of visitors per hour from 10:00 to 17:00). It also allowed us to use Activity Counter Maps (Fujii, 1973) for visualizing the distribution of occupation in the whole of the park combining the values obtained in each sub-place (fig.3)

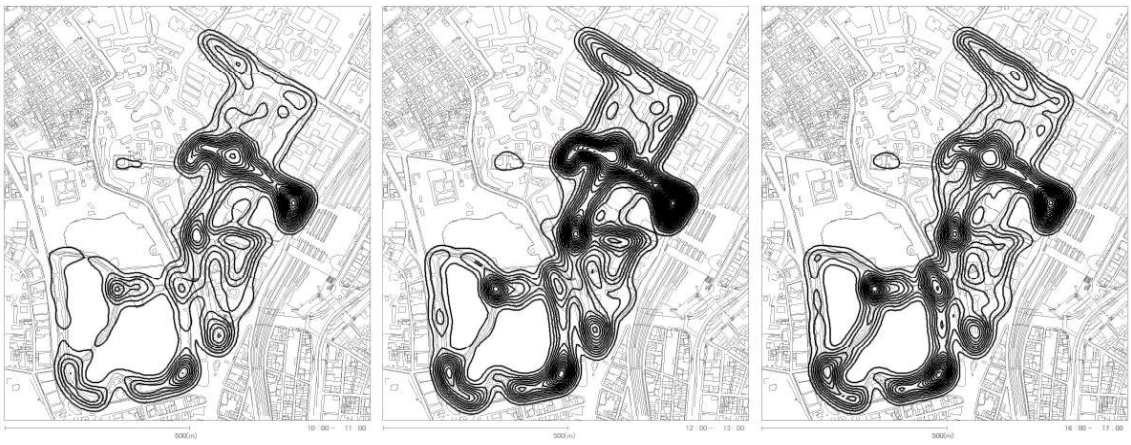


Figure 3. Activity Counter Maps for three sample time frames

Clustering analysis

At this point of the research, all the three main components (Elements, Visual Scenery and Activity) had been divided into categories and variables, resulting in a database in which every sub-place has a total of 103 variables divided in three categories plus one more total category (all variables combined). This allowed us to study the park as a system of places, grouping places together not accordingly to space correlation, but to their character as a place, represented by the place variables. This was achieved by doing clustering analysis, which basically groups objects (in this case the sub-places) together according to level of similarity or difference (geometric distance in a multidimensional space), forming clusters of objects. Cluster analysis can be applied to many different types of researches, since what it does is to translate raw data into meaningful structures. There are many methods and clustering algorithms available, depending on the kind of data and how it wants to be analyzed. For this research the most suitable method was Ward's method, which was developed exactly in order to take account of the similarity between objects in relation to many variables (Ward, 1963). It is also focused on quantitative variables rather than, for example, binary variables (like the case of this research, where every variable is represented solely by a quantity). Ward's methods differs from others because it uses a variance approach to evaluate distance between clusters, and is regarded as the method that gets closest to the way in which humans would instinctively perform clustering of objects. It important to point out that for the cluster analysis the database was normalized in order to reduce redundancy. In the case of Ward's method, the different variables were turned into ratio, reducing the distance be-

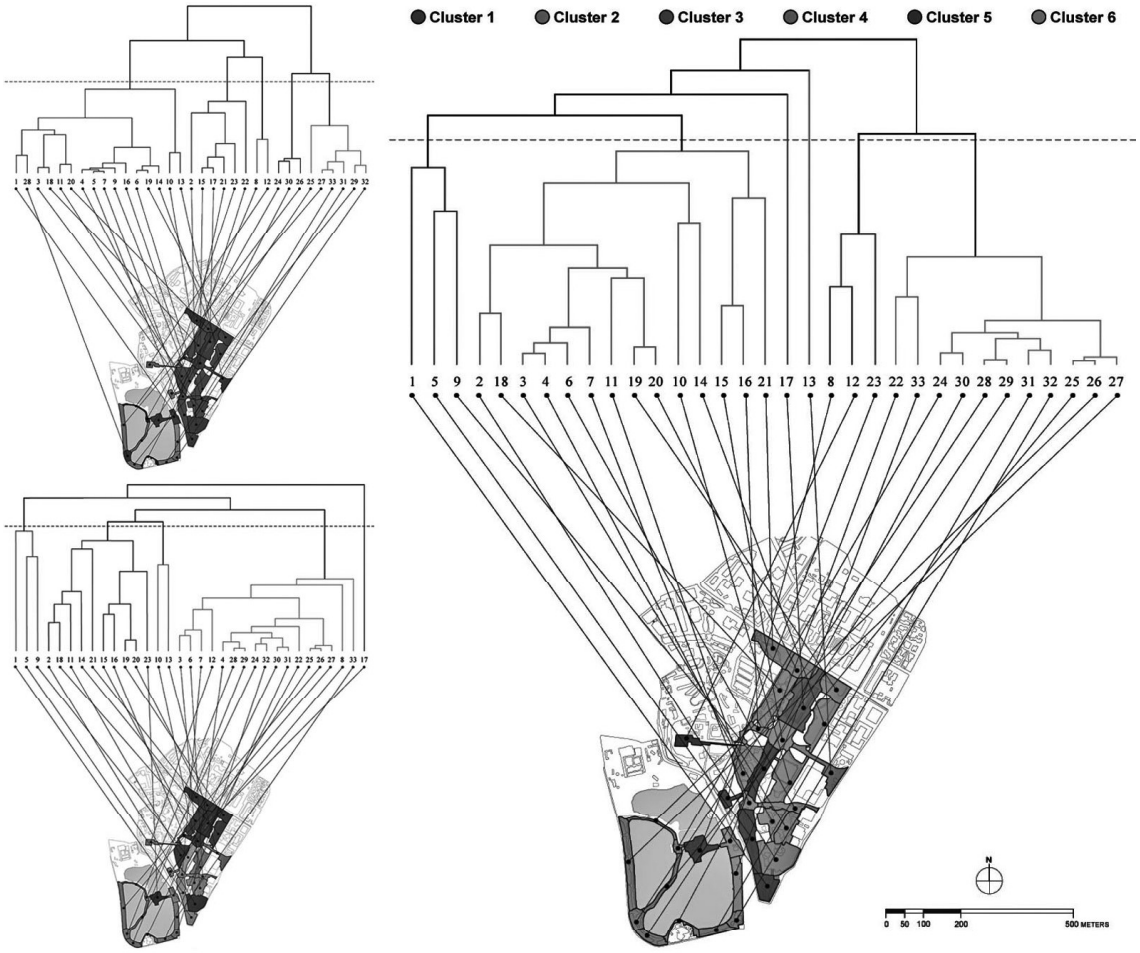


Figure 4. Maps showing the clustered places and their level of linkage

tween them and allowing visualization of more meaningful patterns. The resultant clusters were then translated into maps showing the level of linkage between sub-places (fig.4).

Conclusion

When we clustered the sub-places based on all the variables combined, there was uncertainty about the possible results, because sub-places which were evidently unrelated could end up together in a cluster. However, the results were surprisingly coherent with the spatial organization and characteristics that can be experienced by any visitor to the park. For instance, the places around Shinobazu pond are clustered together. The same happen with religious places, even that they are not always grouped together in the cluster analysis of single components. The upper area of the park is divided in two clusters, in which is easy to recognize a main axis surrounded by the different districts of the park. These are examples of qualities made evident only by mapping the cluster analysis' results.

The research shows that the common structure of a place can be measured, allowing assigning place variables to a geographic partition, visualizing and grouping them according to parameters which altogether can communicate the common character of a place. In the case of Ueno Park, the research made possible to visualize the park as different clusters of places depending on specific place-components. The coherency of the clusters obtained when all the variables were combined and analyzed indicates that each component by itself is not capable to fully retain all the characteristics of a place. This was possible to achieve only when the variables were combined, in the same way we experience places: as unified wholes. The proposed methodology allowed results that can be useful when researching a distinctive place or area of the city (like in the case study) but also offers information that could be useful when engaging in urban and architectural design, potentially incorporating place-variables to the design process. In that case, the collected information allows to make place-based decisions, like merging many places into a bigger one, potentiate certain characteristic and diminish others, create place continuity or place disruption, and to preserve places or change them completely. Undoubtedly, the methodology is not able to capture the total phenomena that a given place could mean for a single individual, but establish a starting point for adding meaningful place-distinctions to maps and urban visualization.

References

Bouwhais, D.G., Bridgeman, B., Owens, D.A., Shebliske, W.L., Wolff, P. (1987) *Sensorimotor Interactions in Space Perception and Action,* (Elsevier Science Publishers B.V.).
Casey, E. S. (1997) *The Fate of Place: A Philosophical History*, University of California Press, USA.
Fujii, A. (藤井 明) (1972) *Theory of Activity Counter: Geometric Features of a Jordan Curve* (活動等高線論：閉曲線図形の幾何学的諸特性について), unpublished Doctoral thesis. University of Tokyo, Japan.
Gehl, J. (ed) (1987) Life Between Buildings: *Using Public Space*, Van Nostrand Reinhold. New York.
Gehl, J. Gemzoe, Lars. Kirknaes, Sia. Ekland, Britt. (2006) *New City life*, The Danish Architectural Press, Copenhagen.
Lynch, K. (1960) *The Image of the City*, MIT press, USA.
Phys 531 (2007) *Lecture 11, Survey of Optical Systems,* University of Virginia, (http://galileo.phys.virginia.edu/classes/531.cas8m.fall04/l11.pdf)

Memory and Morphology

Jeffrey S. Nesbit
College of Architecture Texas Tech University, United States
Keywords: urban design, urban metabolism, urban memory

Abstract

In Architecture of the City, Aldo Rossi describes a definitive characteristic of the city and it's collective memory through 'genius loci' and 'locus'; urban artifacts and its surroundings (Rossi, 1982). Layers of collective memories and urban artifacts reference historical events and present spatial consequences of current individualities. Urban memories implant singular nodal moments in time while the collective identities are distributions of disparate artifacts emerging and transforming as urban contextualized spatial agents. Resembling the work of Lebbeus Woods in Sarajevo's conflicted past (Woods, 1996), artifacts of architectural memory provide clues on how the shaping of our future cities can be observed as a combination of historical events imprinting traces on a fluctuating urban terrain. Evolutionary processes within collective form allows for morphological engagements to be implemented as new radical strategies for urban growth. Initially borrowed from Fumihiko Maki's 'group-form' generative elements (Maki 1964), Thom Mayne's interpretation of the city is described as a 'constellation of polynucleated attractors'. The Post-Modern city 'is not the production of platonic solids but rather multiple and overlapping forces of a highly complex and entirely uncertain collective form' (Mayne 2011). Where do these moments of urban morphological processes and collective memory merge within the fast-paced 21st century of tomorrow? This paper attempts to uncover signs of intrinsic collective memory and morphology as latent potentials within our increasingly complex contemporary urban fabric.

"The collective memory participates in the actual transformation of space in the works of the collective, a transformation that is always conditioned by whatever material realities oppose it." - Aldo Rossi, 1982

Introduction

Urban memory can be defined through a collection of historical events and the physical components demonstrating the societal reflections of instances in time. In doing so, the city operates, consciously and unconsciously, through collections of built morphological processes. In the *Architecture in the City*, Aldo Rossi rightful describes the city itself as "the collective memory of its people, and like memory it is associated with objects and places." (Rossi 130) However this relationship between memory and the constructed objects can be described across multiplicities of morphological indicators. Sometimes these forms are physical manifestations generated by political emblematic structures, celebrated as objects. Other times the city has the plasticity to exemplify internal views and engagements of its inhabitants through events within space. Inherently, the nature of urban memory has the capacity to transform collective form, architectural typologies, and cultural milieu in a variety of modes, regardless of reproductions made by staged events or glorified objects. If evaluated thematically, these transformative tools cultivate consistent memories. In classically ordered cities, like that of Paris, collections of built form grew out of pre-ordained object types. The seemingly variable formulas employ strict architectural typologies and set the stage for a deceptive cultural identity. The classical city's identity can be perceived through the typological consistency and consciously become part of the continuous urban façade. On the other hand, if evaluated internally, the idiosyncratic manipulations can posit sensible localization and culturally distorted resolution. Contrary to the highly regulated urban planning models, newly established megalopolises, like Jakarta, unconsciously grow out of internally structured necessities, economic irregularity, and conflicting histories. Both examples, systematic or not, are indications of complex memories. Each fundamentally formulates their own methodical processes and varying layers of morphological states.

As physical manifestations storyboard fragmented histories of social ideologies, "memory becomes the guiding thread of the entire complex urban structure". (Rossi 130) If this is true, what ways have contemporary cities adapted to an already-established history and forecast into an ever-changing future strata? As urban detectives we can begin to define the instances and behaviors of memory by identifying such morphological clues. This paper considers three analytical methods, *isolated memory, collective memory,* and *fragmented memory*, in an attempt to decipher how urban memory informs and transforms built morphological states into a collection of cultural threads.

Isolated memory: artifacts and the artificial

Upon initial identification measures, city hierarchies have the tendency to nurture historical, isolated memory. Historical events, people, and power become isolated amplifications. Reflections of these moments are enabled expressions of architectural artifacts across time and space. While isolated, the caricatures of over-idealized references define landmarks as navigational tools as well as distinguish an iconography for global identity. Can we treat such isolated artifacts as truthful portrayals of cultural and social memories, or do they simply become artificial, broken memories of past events and societal ideals? Historically, cities have always positioned architectural artifacts as attempts to maintain the relationships built from events and reflections of its inhabitants. Rossi describes the city as "the locus of collective memory" and intrinsically defines the interconnected relationship between the people and the artifacts left behind. As the locus, or collections of artifact become "the city's predominant image", the city has the ability to materialize memory and culture (Rossi 130). While the city progresses into new technological paradigms, isolated, past references seem to lose their intended, inherent qualities of absolute collective memories. Particularly, the architectural tools also lack the ability to

evolve as the urban fabric continues to extend into contemporary and future evolution. Rossi addresses this contiguous dilemma and continues to explain how "certain artifacts become part of its memory, new ones emerge". By stating "new", it is implied that the locus must change and become participatory in the nature of future societal adaptation. If the artifacts are altered states of loci, then its implications contribute to a loss of historical narration and effectively blur allusion, or even more dramatically, break from an associative reference.

Platonic references

The artifacts of isolated memories embedded within the city define nodal markers of position. These nodes are often preserved states of historical significance. Intentionally placed as city planning organizational tools, the monumental and memorial identifiers aid in way finding to form efficient circulatory systems. The affect generates not necessarily references to a historical narrative but rather gravitate mobility across the city. Famous modes of organization are most clearly evident in the Nolli Map of Rome with triumphal arches and obelisks or Haussman's radial plan for Paris. Two outcomes are derived from this type of planning tactic. Firstly, the isolated artifacts attempt to produce utopian, idealistic organizations of an ordered city structure. This implies the desire for societal intelligence to generate sophisticated future memory states. Unfortunately, the ideal geometry signified by the isolated platonic landmark lack flexibility of real operations embedded deep in the complex urban physical and cultural structure. Secondly, the architectural typologies, iconography and ornamentation applied to the monumental and memorial artifacts supplement platonic references to such ideologies borrowed from suggestive precedent. Once borrowed from broken cultural and localized reference, the artifacts obviously are unable to contextualize in the new implantation. Rossi uses Greek architecture as a platonic derivative transformed and transplanted into other cities and other cultures. "It is Greece where the fundamentals of the constitution of the city lie, as well as of a type of urban beauty, of an architecture of the city; and this origin has become a constant of our experience of the city." (Rossi 134) He uses Athens as the first example for what he calls the "science of urban artifacts". This cross inbreeding of architectural language intensifies pure form as it populates across global regions. The more populated, the more the architectural artifacts become isolated, artificial memories. Copies of copies continue to deprive meaning while simultaneously intensify isolation. These consequences fail to generate a sensible memory for urban continuity, and define isolated memories incapability of properly expressing historical memory and acknowledging future augmentation.

Preservation and myth

The generation of evolutionary memory must address regulations of preservation in addition to conflicts of myth – the relationship between built form and transmitted memory. The denial of evolutionary time in isolated memories can be attributed to obsessed contemporary preservation methods. The United Nations Educational, Scientific, and Cultural Organization, otherwise known as UNESCO, states in the World Heritage mission that the organization "seeks to encourage the identification, protection, and preservation of cultural and natural heritage around the world considered to be outstanding value to humanity." (UNESCO 2015) How does this kind of preservation also contribute to unpredictable ecological, political, and environmental futures? In John Ruskin's *Seven Lamps of Architecture*, he directly addresses similar questions of past knowledge into future responsibility. Within the "Lamp of Memory" Ruskin declares, "it is again no question of expediency or feeling whether we shall preserve the buildings of the past times or not. We have no right whatever to touch them. They are not ours. They belong to those who built them, and partly to all the generations of mankind who are to follow us." (Ruskin 358) At first it may seem as though Ruskin is condemning the possibility of artifact adaptation to further extend isolated memories into future generations. Instead, it could be argued he is criticizing historical preservation methods of protecting and freezing artifacts in isolated time. The memory of time and space evolution does not suggest eradication of

isolated memory either. Ruskin elaborates, "the super induced and accidental beauty is most commonly inconsistent with the preservation of original character, and the picturesque is therefore sought in ruin, and supposed to consist in decay." (Ruskin 351) Weathering, ruins, and decay negotiate authority over purity and idealistic reference by virtue of natural, environmental impacts. The impacts of artifacts through truthful legacies of history legitimize memories of past, present, and future knowledge.

The myths associated with the preserved isolated memories, particularly those struggling to be kept frozen in time, deliver conflicting artificialities of emergent fluctuations. The contemporary city is limber. Systems, infrastructures, commerce and so on, acclimate to change remarkably well and oscillate directly up against the stagnant artifact. Not so different than the obelisks in Rome, the city of Seoul possesses an exemplary sample of evolutionary growth and contemporary proximities exaggerating an isolated artificial artifact – physically and referentially – acting as an urban void. Once part of the old city wall during the Joseon Dynasty, Sungnyemun gate, monumentally stands as a stone-walled structure with a two-tiered traditional Korean roof. Seemingly, the gate is 'actually' a physical artifact of a traditional past. However, the gate was in reconstruction for 5-years after a fire almost completely destroyed the structure, and recently reopened in 2013. (Figure 01) The myth, or historical reference and the artifact itself become further and further unglued. When myth becomes material memory "the logical principle of the city has already emerged from its relationship with nature and becomes the experience which is transmitted." (Rossi 134) Differing to Sungnyemun, a precedent against such myth and preservation can be found in the 18th century with the artist Giovanni Battista Piranesi. The vibrant and detailed etchings by Piranesi speculate on the relationship between the investigation of myth and evolution. In his *Arch of Titus*, the duality between the natural vegetation and artifacts of the Roman past playfully demonstrate an ever-changing state of primacy – an urban memory flourishing within the continuous flux of decay from the artifact and erratic seasonal growth of vegetation. This scene of successful conflict can be used as an encouraging example of genuine artifact adaptation and prosperous future urban memory. As we evolve through culture, technology, and social progress, so do our transformations of artifacts in the built environment.

Collective memory: group-memory form

Within the next layer of urban memory, we uncover consistent architectural populations. Moving beyond the isolated glorified artifacts, contiguous form extends and populates across the urban ground. How does this layer of duplicated architectural vocabulary inform collective memory, or is it the collective memory informing the architectural characterization? Although deciphering the codes of collective memory is complex, numerous examples of urban consistencies interacting with cultural milieu are revealed. From the Kampungs in Jakarta, Indonesia, along the mountainsides in Gamcheon, Busan, Korea, and armatures in the lengthy street markets of Delhi, India morphologies provide cues of collective memory. (Figure 02) The architectural elements and spatial vocabulary of such consistencies are not formed through regulatory ordinances. Instead emerge as continuous feedback responses from complex proximities, topographic necessities, and traces of historical codification of space and form. The effect indicates collected memory between one 'object' to the next. In many cases established by local residential and commerce units, the 'objects' populate carrying an inherent morphological memory. The Modern urban planning grid from the early 20th century greatly deduced collected memory and morphological variation into strict, regimented system incapable of responding to cultural knowledge. In fact, the planning modes uncompromisingly lay down the Modern grid and, quite politically, disengage public participation. Aimed at the importance of this topic, the Modern grid destroys collective memory and ignores unpredictable future consequences.

Group form

During the mid-1960 a group of architects, popularly known as the Metabolists, set out

Figure 1. Photograph: Sungnyemun gate, Seoul, Korea; fire (top), reconstruction (bottom). (Source: thehistoryblog.com/archives/25008, author)

to investigate antithetical processes in urban design – emphatically testing scenarios of collective morphological methods without the top-down regulatory grid found in Modernism or the overly massive brutalism imprint. For the Metabolists in Japan, the Brutalism and Modern Movement were focused on "man's immense desire to make buildings grand and perfect." (Maki 4) Alternatively, the collective form strategies were a clear break from classical and modern planning principles intended on asking questions such as the meaning of the "master plan". Fumihiko Maki states it is "not a 'master plan', but a 'master program', since the latter term includes a time dimension." (Maki 4) The time dimension for us here is critical. By adding time into the equation requires disclosure of

history, memory, and culture. The work from architects Kenzo Tange and Arata Isozaki sought out to push back on the rigid grid model in order to maintain such temporal, but collected memory threads. The immediacy of independent units fluctuating in a copied and multiplied system offers character consistency with the simultaneity of elastic variability. Can this same tactic of group-form morphology include cultural memory? "Time-based phasing, scenario planning, and versioning strategies respond to the modern reality of continual change" and provide changes in memory as futures progress into non-deterministic states. (Mayne 51) The ephemeral nature of memory manifests the relationships of its people and current, and continually evolving collected knowledge and ideology. (Figure 02) Again we can reference Maki as he continues to suggest "there exists unquestionably a clear structural relationship between the village and the houses, between village activities and individual family life". (Maki 18) If we consider Maki's explanation of activity and object, we can use the same observation when evaluating the relationship between collective memory and the objects possibility for morphological sequence, and vice versa. "There prevails an understanding of basic structural principles in making the village… group-form and its space are indeed proto-type elements, and they are prototypes because of implied system and linkage." (Maki 18-19) Just as Maki writes, the consistency exists through an understanding of principles. These principles are the underbelly of historical legacy, spatial knowledge, and collective memory. As the projected continuation of future use, unlike the fixed states of isolated memory, design criteria here could allow for changes to associative memory as long as it is grounded by collected knowledge. The morphological sequences will ultimately follow and merge into new, unexpected and historically connected form.

Fragmented memory: poly-nucleated unconsciousness

Contemporary cities and the scenario of collective memory derived from group-form become more and more complex. For architect Thom Mayne, the once "stable and hierarchical spatial organizations" have now "liquefied into a dispersed urbanity". (Mayne 27) Due to erratic growth and economic instability encourage breaks of collective memory. A

Figure 2. Aerial: Kampungs, Jakarta, Indonesia (Source: google.maps)

new dispersed form emerges "spontaneity and non-sequential" vitality of historical trace. Maki used conversations of history as consistent architectural themes while now in megalopolises around the world deny realistic consistency of history, memory, and form. In exchange, conflicts of development, economics, and desire for global identity redefine collective, urban memory. Today, the interactions of forces inform new futures and disperse cultural consistency. The severance of social, political, or cultural practices from their native places and populations brings us to the third analytical method, *fragmented memory*.

Fragmented trace

Two types of fragmented memory exist in the city. The first, more as a physical morphological combination, 'the city' consciously and unconsciously leaves historical events as broken traces of past, present, and future memory. Colin Rowe's Collage City from 1978 theorizes urban form as a non-sequential series of fragmented collisions and superimpositions advocating for an abandonment of utopian idealism. For Rowe, the city is made up of fragmented references borrowed from historical and implanted traces. Paradoxically, the urban consciousness informs the idealistic attempts set in micro-patterns of organization while unconsciously being destroyed by internal conflict. The reality of the contemporary city and the behavior of activity within do not follow a singular, connected memory of consciousness; both formally and idealistically. Conflicting and fragmented struggles give vitality to urban behavior. Lebbeus Woods' speculative work in Sarajevo directly asks questions of conflict between event, time, and trace. Woods lays out three principles to define plausible alternatives for addressing historical trace; (1) restore what has been lost, (2) demolish the old and build new, (3) define new forms from altered states of the old. (Woods 16) The three clearly are tactics for preservation methods. Though, the third principle adds a new ideal to preservation tactics. Ruskin and Piranesi both provided clues to allowing for continuous growth of old artifacts. The new form from damaged ones radically revolutionizes the opinions of artificial preservations and myth. In fact, new informing old and old informing new re-defines authenticity as a tool for evolutionary memory and cultivates "the memory into something entirely new and affirmative" (Woods 3).

Figure 3. Photograph: Houtan Park, Shanghai, China (Source: author)

Centered on evaluations of disjointed diversity, fragmentation samples in the megalopolis of Shanghai denote productive tools for versatility and opportunity. New development along the Huangpu River, the neighborhood of Xintiandi, and disparate instances in Puxi take advantage of fragmentation. Three methods can be identified which employ strategies of productive fragmentation and inform past, present, and future unknowns. West of the Nanpu bridge, situated along the north and south bank of the Huangpu River physical traces of 'historical' structures remain. Previously enclosing specific events during the 2010 World Expo and operating even earlier as shipping facilities, the stripped skeletons transform into malleable public zones. The public engagement into and through the bizarre remnants of a broken past ambiguously stretch fragmented memories of culture, power, and the newly established art initiatives. (Figure 03) Secondly, foreign implantations of diverse architectural elements hybridize the urban fabric and deconstruct the once isolated artifacts. The contemporary disposition of Shanghai evolved into one of the most culturally diverse cities in the world, consequentially displaying some of the most robust relationships of history and morphology. Shanghai's history has supported international growth and foreign investment. Architectural styles such as

Figure 4. Photograph montage: Odaiba Island, Tokyo, Japan (Source: author)

Baroque, Gothic, Neo-Classical, Renaissance, and Romanesque Revivals along with various insertions of Art Deco populate the city today. This cross-cultural pollination informs fragmented and hybrid morphology by merging and dissecting the traditional Chinese urban identity. And the third performs more as overlapping multiplicities operating concurrently with incongruent activity. In various intersections of conflicting programs, built form, and infrastructural responsibility, the city seems to promote continuous exchange. The emergence of publically active programs and city utility systems clearly allows for multivalent interactions just as the interiority of the city activities become intertwined. And for Rowe, "replace the isolated building and building programme with the overlapping of buildings and programmes". (Rowe 41) Shanghai's resilient fragmented memory and morphology can be seen as confirmation of Rowe's predictive treatise established over 30 years ago. Intentionally the non-master planned space provides non-deterministic possibilities of present and future urban memory.

Fragmented fantasy

The spaces remnant from fragmented memory circumstances merge into hyper-realities of over-indulged consciousness. Furthering our conversation of memory, in addition to collected and broken histories, the contemporary city permeates evolutionary imagination. Beyond collected artifacts, fragmented structures, and layered programs, the city as a stage transmits illusory and paradoxical realities. Colin Rowe describes the hysterical impulses of rapid imagination by alluding to the amplifying of fictional posture. Pressures borrowed from science fiction could cause "the death of architecture, not building" thereby, in affect, annihilating spatial memory. (Rowe 41) Fictional, staged urban places such as Odaiba Island in Tokyo possess 'artificialities' not so different than the artifacts discussed in isolated memory segment at the beginning of this paper. The Odaiba Island contains a replica of the Statue of Liberty, a 115 meter tall Ferris wheel, over-scaled 18 meter tall Gundam, all of which are situated adjacent to an artificially constructed beach. (Figure 04) The dilemma with the so-called fragmented memory in this urban environment is the paradox between real space and artificial memory. The objects on the island are real, haptic, made of materials, and full-scale. Can we consider these fantastical experiences to be just as real compared to the deep 'authentic' neighborhoods in Jakarta? Similar to the anecdotes of Koolhaas' New York, contemporary fantastical settings are the instigator for future fragmented memory. Koolhaas' downtown athletic club offers up the same fantastical present and elastic evolving memory by allowing for "fantastic juxtaposition of its activities" and defining "separate installment of an infinitely unpredictable intrigue". (Koolhaas 157) No longer do the memories of our urban experience require prescription of only architectural artifact in order to amplify space and time. The fragment materiality, unpredictable fantasy, and radical cognition "transcend the physical realm to become cerebral". (Koolhaas 160) Breaching a level deeper, we can ask ourselves – do 'artificial architectures' possess the same capability of truly fictional imagination thereby intensifying urban memory and experience of spatial fragmentation?

The film's written and directed by Christopher Nolan seem to yield more architectural, urban space than some of our glorified artifacts in physical reality. Contrary to the obsessions of artificial representation uncovered at Sungnyemun gate and Odaiba Island, Nolan's films build transformable space and narration that cleverly wraps, breaks, and skews memory more similar to our 'real' consciousness. Particularly, Memento and Inception radically blend the real sequence of time into something that is not tangible, manageable, or representational. The sliced and shuffled scenes in Memento cause fragmented collections of connected, yet blurred discrepancies. The main character Leonard is faced with dementia causing him to trace his steps by tattooing notes on his body. The tattoo marks when his clothes are removed sets a supposed fix position in time. However, even with understanding the association of tattoo and time, the story still fractures knowledge and paradoxically disjoints clarity. The amalgamation of encounters with other characters, such as Natalie, never indicates to the viewer if they are divulging the truth about plausible micro-narratives and the dilutions of temporal sequences. As for Rowe we know now that "what we call science fiction also antedates the collapse of

modern architecture's millennialistic idea" which extents our fragmented memories into further urban dimensions like never before.

Conclusion

Fragmented histories of social ideologies in the contemporary city must adapt to an established history and redefine scenarios of unpredictability into the ever-changing urban experience. Whether we fully are capable to articulate what this amalgamated memory is as a holistic complex structure, as urban detectives we must guide morphological methods cultivating future memory, dementia, and resurgence. The three analytical methods described in the paper do not anchor three independent unaffected instances. Each slides into and breaks apart from one another at an incomprehensible magnitude. The knowledge of our past, present and future is complex and non-sequential. From urban codes, memory builds internally deep within the complexity of the contemporary city. Urban memory informs and continues to transform morphological processes. With the desire for more conservative preservation, rapid acceleration of technology, hyper-fragmented realities, and growth of the mega-city, we can anticipate our memories of experience to blend well beyond the isolated, collective, and fragmented memory.

References

Banham, R. (1976) *Megastructure: Urban Futures of the Recent Past* (Thames & Hudson, London).
Koolhaas, Rem (1994) *Delirious New York* (Monacelli Press, New York).
Krier, R. (1979) *Urban Space* (Rizzoli, New York).
Maki, F. (1964) *Investigations in Collective Form* (Washington University Publication, St. Louis).
Mayne, T. (2011) *Combinatory Urbanism: The Complex Behavior of Collective Form* (Stray Dog Café, Culver City).
Nolan, C. (2000) *Memento.* (Summit Entertainment).
Piranesi, G. B. and Levit, H. (1976) *Views of Rome, Then and Now: Giovanni Battista Piranesi* (Dover Publications, New York).
Rossi, A. (1982) 'The Collective Memory'. The Architecture of the City (MIT Press, Cambridge) 130-137.
Rossi, A. (1982) 'The Locus'. *The Architecture of the City* (MIT Press, Cambridge) 103-111.
Rowe, C. (1984) *Collage City* (MIT Press, Cambridge).
Ruskin, J. (1849) 'Memory'. *The Seven Lamps of Architecture.* (Blackfriars Publishing, London) 146-165.
United Nations Educational, Scientific, and Cultural Organization (2015) World Heritage (http://whc.unesco.org/en/about/ accessed 10 June 2015)
Woods, L. (2012) *Beyond Memory* (https://lebbeuswoods.wordpress.com/2012/03/22/beyond-memory/ accessed 15 April 2015)
Woods, L. (1996) *Pamphlet Architecture 15: War and Architecture* (Princeton Architectural Press: New York).

Urban Morphological Study Based on the Plot's Character index

Wowo Ding, Lian Tang
Department of Architecture, School of Architecture
Urban Planning, Nanjing University, China
Keywords: Urban Fabric, Contemporary City, Building Form, Plot

Abstract

Based on Conzenian school's theories urban form is defined by three fundamental physical elements: buildings and their related open spaces, plots or lots, and streets, through controlling these morphological elements urban design could reach its goal for the quality of urban spaces via forms. Therefore, urban design needs to study urban morphology and their physical elements to provide knowledge to support the practice. Among the elements, 'plots' is the key issue in terms of urban design, since it could carry on the urban planning indicators and urban functional regulations to the site as guide for the further building design. This paper focuses on the plots, through analyzing plot's characters such as: location/indicators, size/shape, and building context, to see the correlations between plot's characters and their buildings forms. Commercial plots are selected since their complexity, disorder and seemed-uncontrollability. More than 500 plots in the center of Nanjing city are chosen and the plot's location, FAR/coverage, size, shape, outline and angle are collected as the plot's character index database. Through statistics and analysis the result will show that the plot's character plays an important role in forming the building shapes, that the plot's shape and outline could guide the design and form making.

Introduction

To identify and describe the character of cities or town, urban tissue are put forward and theorized as an effective framework and method. The physical characteristics of urban space are revealed through 'the concepts of pattern, complexity, the hierarchy of components, level of resolution, level of specificity, the pertinent characteristics of position, outline and internal arrangement and the procedures of geometric and chronological comparative analysis', etc. (Kropf, 1996). Subsequently, in a recent article, Kropf carried on a detailed critical analysis of the definitions of built form as used in urban morphology and summarized a compositional hierarchy of physical built form constituted by eight primary levels. (Kropf, 2014)

Such character assessment and description is also important to the urban design process. As through controlling morphological elements such as streets, plots, etc. urban design could reach its goal for the quality of urban spaces via forms, to understand how these elements are related to other elements within a larger structure will provide knowledge to support the practice (Ding, 2013). Among the elements, 'plots' is the key issue in terms of urban design for its close relationship with building forms. In many studies, plots are analyzed in detail and explain why building forms shaped, especially in traditional cities (Esfanjary, 2015; Kealey & Simms, 2008). But when "plots" are considered in modern cities, researchers are careful and reticent. On one hand, some plots in modern city are the results of historical mutation but some experience huge changes; on the other hand, the plots are quite different with traditional ones in relationship with streets, shape, and scale etc.(Oliveira, 2013) As Kropf pointed out where there is access to individual plots on more than one side of the block, the resulting pattern of streets and blocks becomes an interlocking form (Kropf, 2014).

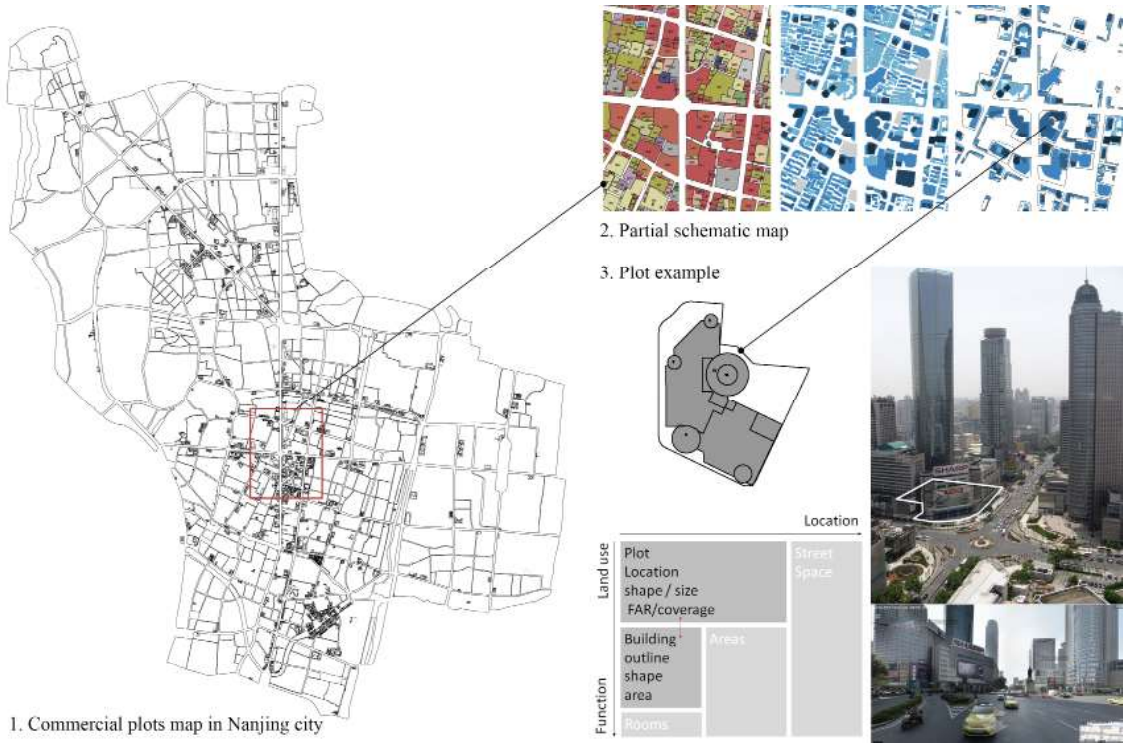
Obviously, the new kind of diffuse, loose and discontinuous 'fabric' of modern city presents new challenge for the research. Levy indicated that the way in which these new urban features relates to each other is different. He also pointed out that plots no longer have a structuring role, the relationship between urban form and building type is no more dialectical. "The identification of these new urban elements and typologicla transformations must be refined and developed: the principal aim of morphological analysis of the new fabric should be to understand the changes that have led to its creation." (Levy, 1999)

Based on the above, this paper focuses on the plots in modern city. For modern cities, the interpretation and analysis for existing urban texture lay the basis for urban design and urban space construction, and urban morphology provides the support to it in terms of theory and methodology. Targeted at plots, since it could carry on the urban planning indicators and urban functional regulations to the site as guide for the further building design (Slater, 2001). The research covers the following basic questions, including: 1. Compared to traditional cities, how to describe the plots of a modern city? (Research on description methodology) 2. What's the relationship between plots and builing forms? 3. Is it possible to control the built form via controlling the plots? (Urban design theory and methodology). Among others, cognition and description supplement each other, and the texture characteristics determine specific method for texture description. To answer question 2, besides historical research, separate research also needs to be carried out on the relationship between the fabric and morphological level components such as indicators and plots. 3 is to find the optimum route to future cities on the basis of 1 and 2.

Methodology

Then, how is the research conducted? Several fabric types and urban space types not present in traditional cities have appeared in modern cities. From the architectural point of view, there is difference between the requirements and needs of different functions on buildings and relationship between buildings and sites, which will inevitably affect urban fabric and urban space; the function for plots is land use. More and more specific land use involves in planning and urban development; therefore, to classify the texture types of modern cities by land use can be regarded as the basic classification method for the

Figure 1. Commercial plots, urban fabric and urban space



texture of modern cities. The classification makes the above-mentioned Research 1, 2 and 3 be carried out in a more specific and detailed way.

Many researches have involved residential areas and tried different methods (Berghauser Pont & Haupt, 2010; Yu & Akkelies, 2014). Commercial buildings account for a higher and higher percentage in public buildings in modern cities, which have become an important part constituting urban texture and urban public space image. More and more urban public activities occur in commercial buildings. In addition, commercial buildings are closely related to streets, and commercial buildings constitute main interface for urban space. In this article, 208 plots in the old urban area of Nanjing Municipality with retailed commercial land use and mixed land use of commercial and office space[1] is selected (Figure 1), by centering on the questions of "How to describe?" and "What is the relationship between building forms and plot indicators?", to discuss the description methods of urban public building plots and corresponding texture and urban space, to analyze the relationship between plot indicators and building types and urban space and to prepare for urban design.

Same as other functional buildings in modern cities, the final presentation of commercial buildings is the results of a series of management control over plot division, definition of land use, setback restriction, land use index, plot height limit and building code by city administrations through urban planning or urban design. Therefore, the specific way for the analysis is to understand the level of building types based on morphology: plot series/plots/

[1]According to "Classification and Codes for Land Use of Urban Construction in Nanjing Municipality 2013 version", the land use for commercial and service facilities is a large category with the code of B, which further includes three classes, namely commercial land use as B1, business land use as B2, and mixed land use for commercial and business facilities as Bb. Commercial land use as B1 is further classified into retailed commercial land use as B11, land use for wholesale market as B12, land use for catering as B13 and land use for hotels as B14 and so on. In this article, only two classes of land use, i.e., B11 and Bb, are seleccted for analysis, corresponding to the land use dominated by retail commerce for shops, shopping malls, supermarkets and markets and the mixed land use dominated by commerce and office buildings.

building & areas and their relationship with street space, to respectively establish several databases for the plot and buildings which include the following important information: plot location, plot shape/area, building shape/area, plot construction index and so on. The plot characteristics and their impacts on building types are analyzed based on the data.

Description and Analyse

1. Plot Character

a. Plot location/street

The relationship between plot and urban streets determines the means of access for the plot, while what grade of urban street the plot is adjacent to will directly determine the locations of plot entrance and exit and the orientation and layout of buildings.

Each plot can show its urban location in the plan showing the scope of old city. Separate description can be given to the types of each boundary for the plot according to the relationship between each boundary of the plot and urban streets to differentiate four types of main street, secondary main street, branch and connection with other plots. In addition, the main frontage (the longest neighboring frontage) will be differentiated, and the description of all the plots below will be given based on the boundary.

According to the classification of boundary type by Zhang Lina (Zhang, 2013), the boundary types for commercial plots in the old urban area of Nanjing are shown in the diagram (Figure 2.1). In the totally 208 plots, Type T46 has the largest number, accounting for 23.4% in the total, which is followed by Type T34 accounting for 14.6% of the total, and then T49 and T30, respectively accounting for 11.7% and 10.7% of the total. That means most cases are commercial plots with secondary urban main streets on one side and urban branches on the other side. The second most cases are plots with main street or secondary main street on one side and connection with other plots on the other three sides; thirdly, the cases are with urban main street on one side and urban branches on the other side.

According to the statistics for frontage types of all the sample boundaries, the largest number of plots is with two neighboring sides facing the streets and the other two sides neighboring other plots (94 plots), accounting for 45.4% in the total. The second largest number of plots is with one side facing the street and the other three sides neighboring other plots (60 plots), accounting for 29.0% in the total. The third largest number of plots is with three sides facing the streets and the other side neighboring other plot (29 plots), accounting for 14% in the total. The plots with two opposite sides facing the streets and all the four sides facing the streets have the smallest number, respectively accounting for 4.3% and 2.4%.

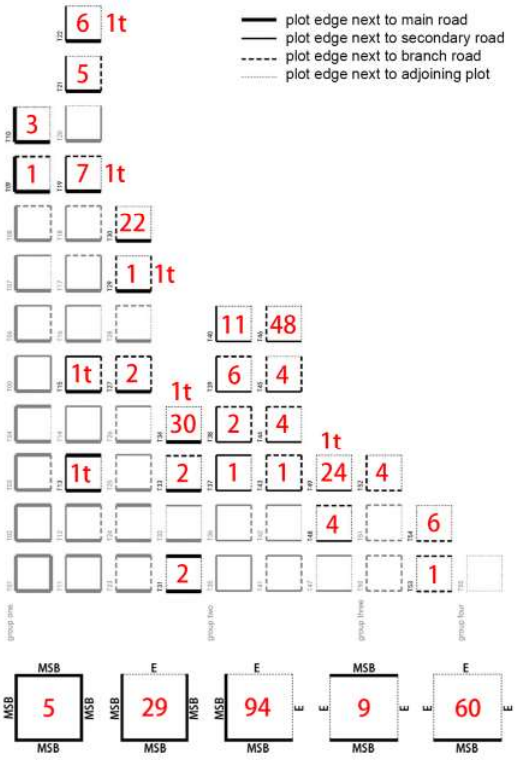
In addition, each plot refers to the main boundary angle to record the plot angle. The recording method is shown in the figure. The plot angle is determined by the street angle, and the angle of sample plots is mainly between -100° and 100°(Figure 2.2).

b. Plot shape/Area

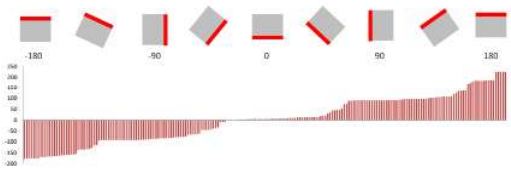
Different from blocks and plots in Europe and the United States, the blocks and plots in China have much larger dimension. Due to historical and land ownership reasons (Zhang, 2013), the shapes of plots are difficult to be described as regular, and there is a big difference in terms of plot dimension. Jiang Jingjing provides the description and classification from a purely geometrical point of view, concludes that most of commercial plots in Nanjing are in the square, strip and L shapes (Jiang, 2014), and it is difficult to differentiate the relationship between plot shapes and roads. By combining with the shape characteristics of urban plots in Nanjing, this article changes to another recording method for plot shapes trying to give a more specific and accurate description about the characteristics.

Different from the way to differentiate the plot shapes simply according to geometrical shapes, with reference to the boundaries of main neighboring streets, the plot shapes recorded in this article are recorded with their grades and length. Then the description is respectively given to the angle and number of broken lines for left and right boundaries with respect to this boundary. Three levels are respectively differentiated for the angle, intersection at obtuse angle o, intersection at right angle a and intersection at acute angle i; then

Figure 2. Plot location / street



1. Plot types / relationship to urban streets



2. Plot angles statistics

the number of broken lines for the other boundary connecting the left and right boundaries is described so as to accordingly reflect the shape change of plot boundaries (Figure 3). For example, Plot 1 is described as So,M50, bi,4; Plot 2 is described as o,S87, i, 1, etc.. Among others, S, M and B are corresponding to the street levels defined before. Corresponding to the description details, the plot shapes can be generally classified into Rec (a,M,a,1), RecX(o(i),M,o(i),1), RecI(a,M,a,>3), RecXI(o(i),M,o(i),>3), RecL(a3,M,a), Tri(i,M,i,0) and so on.

The statistical results respectively for four boundaries show that there are 97 plots with the main frontage as main street, 100 plots with the main frontage as secondary main street and 9 plots with the main frontage as branch street. The length range for the boundary facing main streets is between 14 – 245m, with the average of 85.6m; the length range for the boundary facing secondary main streets is between 25 – 200m, with the average of 75.8m; and the length range for the boundary facing branch streets is between 30 – 112m, with the average of 71.7m. The number of plots with the boundaries vertical to the main frontage on two sides accounts for 74.9% (left) and 77.8% (right); the number of plots with the boundaries at acute angle accounts for 18.4% (left) and 9.7% (right), and the number of plots with the boundaries at obtuse angle accounts for 6.8% (left) and 12.5% (right). The number of broken lines indicates the irregularity degree of the boundary on the back. In the statistics, 3.4% of the plots (7 plots) are triangular without the boundary on the back. 56.5% of the plots (117 plots) have straight lines on the back.

11 plots have two sections of broken lines on the back. 39 plots have three sections of broken lines on the back and 14 plots have over four sections of broken lines on the back.

Further statistics shows that in all the samples, there are 128 plots with both sides vertical to the main frontage, accounting for 61.8% in the total. There are 28 plots with one side vertical to and the other side in an acute angle to the main frontage, accounting for 13.5% in the total. There are 24 plots with one side vertical to and the other side in an obtuse angle to the main frontage. There are 13 plots with acute angle on one side and obtuse angle on the other side and there are 7 plots with acute angle on both sides. The cases with plot boundary angle caused by the angle change of roads account for 44%, and the rest 56% cases are formed by plot division.

In general, in all the plot samples, the number of RecX with angle between lateral boundary and main street is 62, accounting for 30.2% in the total; the number of Rec with regular boundaries is 52, accounting for 25.4% in the total, which is then followed by RecI and RecL with irregular boundaries.

The statistics of plot area show that the area values vary between 708 and 34443 with the average of 6056m2, 87% of which is below 10000 m2.

2. Relationship between building boundaries and plot boundaries

a. Definition of parallel

After describing the boundary characteristics of plots with the differentiation of frontage, vertical side and back side, the buildings in the plot can be described by their correlation with the boundaries. The description consists of two parts, namely, setback and similarity. Setback is the value of plot boundary for the setback of building boundary. The distance of frontage setback directly determines the dimension of street space; the setback of interface connecting with other plots determines the relationship of buildings in the plot with other plot buildings, which, together with the length of frontage, determines the continuity of street interface. Similarity, when converted into geometrical relationship, is the parallel relationship between building boundary and plot boundary. When identifying the similarity, three types are defined respectively with regard to the boundary of a straight line and the boundary of multiple straight lines, namely, complete parallel, similar and dissimilar (as shown in the figure4).

b. Statistics

The statistics show that for the main frontage, 87% of the plots have building boundaries in parallel with plot boundaries with the setback distance of 1-10 meter and the average of 4 meter; 11% of the plots have building boundaries similar to plot boundaries, and 2%

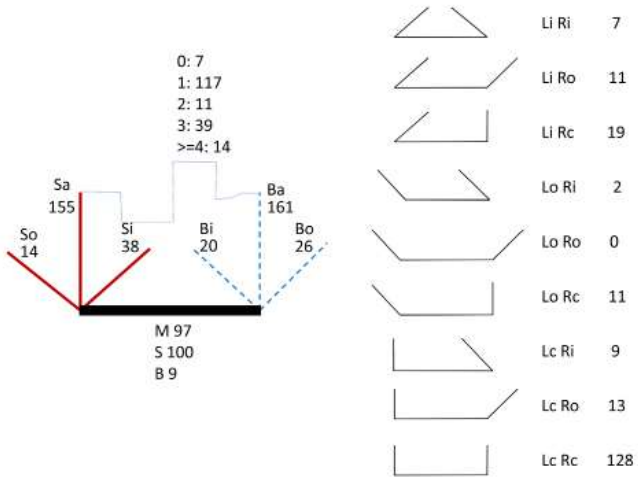
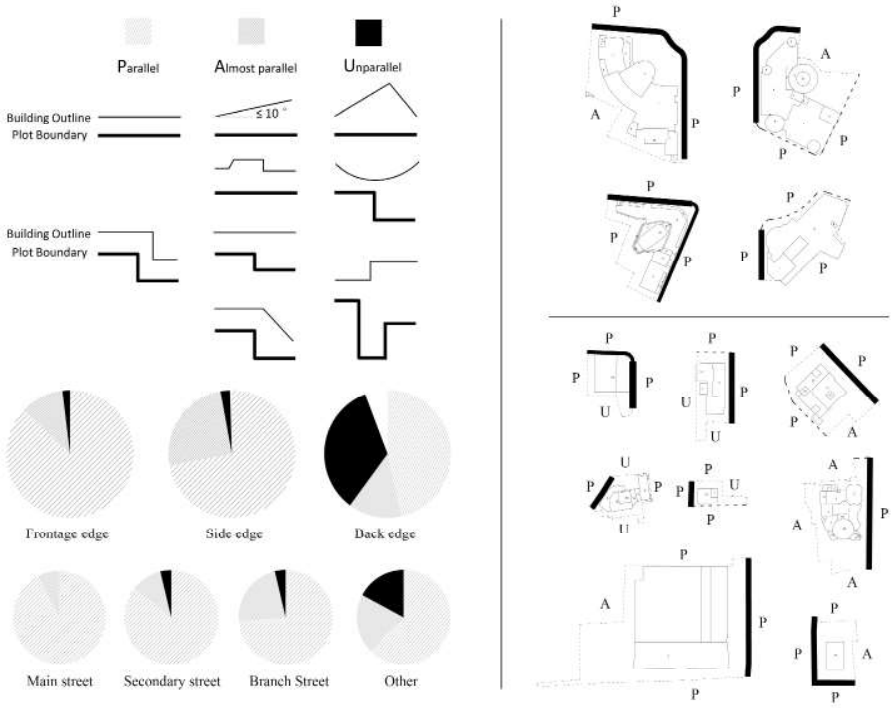


Figure 3. Plot shape

Figure 3. Relationships between building outlines and plot boundaries



of the plots are dissimilar. For the boundaries on both sides, 72% of the plots are parallel, 25% of the plots are similar, and 6% of the plots are dissimilar. For the back boundaries, 47% of the plots are parallel, 13% of the plots are similar, and 40% of the plots are dissimilar. For each plot, there are very obvious rules, that is, the building boundaries of main frontage has the highest similarity to plot boundaries, which is then followed by the boundaries on both sides, while the back boundaries (normally connecting with other plots) have the lowest similarity to plot boundaries. In addition, the statistics based on the differentiation between the boundaries facing main street, secondary main street and branch street and the boundaries connecting with plots shows that, in the boundaries facing main street, 92% of building boundaries are parallel with plot boundaries, and the other 8% are similar. In the boundaries facing secondary main street, 86% of building boundaries are parallel with plot boundaries, 11% are similar and 4% are dissimilar. In the boundaries facing branch street, 74% of building boundaries are parallel with plot boundaries, 22% are similar and 4% are dissimilar. In the boundaries connecting with other plots, 65% of building boundaries are parallel with plot boundaries, 20% are similar and 14% are dissimilar. It can be judged based on the statistics that the building boundaries on main streets have the highest similarity to plot boundaries, which is followed by branch streets and secondary main streets, and the building boundaries connecting with other plots have the lowest similarity. That means most of buildings can normally maintain parallel or similar to the plot boundaries when the buildings are facing the streets, but when building boundaries connect with other plots, the building forms will have irregular changes.

Conclusion and discussion

1. Plots in modern city are very complex but their characters are describable. First character is their relationship with streets. For commercial plots in Nanjing city, the largest number of plots is with two neighboring sides facing the streets, followed by plots with one side facing the street, then plots with three sides of the street or even four sides in addition. Similar with the case mentioned by Kropf, the relationship between street and plots is no longer a simple one to one structure; the situation becomes

much more complex. Second character is plot shape. It's meaningless to describe the shape geometrically without considering the relationship to the streets. Plot boundary adjacent to the streets has direct impact on people's perception of urban space. Statistics in Nanjing shows that, reference to the main frontage, the edge on left and right sides are mainly vertically-oriented, part of an acute or obtuse angel, and most of them caused by street line angel. The back edges, especially edges connected to other plots, are irregular in a certain ratio. Third is the plots index. Because of the functional requirements, the coverage, FAR and height limitation of commercial plots are in certain range, especially coverage, higher relative to other land use plots, which also determines the particularity of the relationship between plots and building forms.

2. The plot's character plays an important role in forming the building shapes, urban fabric and urban space. The irregular shapes of plots may lead to irregular building forms. The building outlines in commercial plots are quite similar to the plot boundaries. Since there are no special requirements in lighting and orientation of commercial buildings, they can be almost any shape; in addition, besides evacuation site required at the entrance, there are no special requirements of vacant land in commercial plots. Based on these two reasons, statistics proves that most of buildings are normally parallel or similar to the plot boundaries when the buildings are facing the streets, when building boundaries connect with other plots, restrictions of plot boundary decline but still more than half of the building forms are similar to the plot boundary.

3. Urban design may guide the building form making via controlling the plot's shape and outline, with appropriate city codes accompanied. Designers are accustomed to respect the plots shape in streets. It is rules of different setting back which produce uneven and scattered spaces.

Through statistic and analysis of commercial plots in Nanjing city, the research shows the potential of urban morphology concept——urban tissue in identification and description of modern fabric. Besides commercial plots, the method advanced in this article can be used to analyze other types of plots to discover more rules to provide knowledge for practice.

References

Berghauser Pont, M. and Haupt, P. (2010) *Spacematrix: space, density and urban form* (Netherlands Architecture Institute, Amsterdam).

Ding, W. (2013) 'Urban design needs urban morphology: a practitioner's viewpoint', *Urban Morphology* 17(2), 120-3.

Esfanjary E. (2015) 'The longevity of Persian urban form: Maibud from late antiquity to the fifteenth century', Urban Morpholgy 19(1), 57-71.

Jiang J. (2014) 'Characterization of the relationship between commercial plots and building patterns: a general survey in urban area of Nanjing, China', ISUF 21th Conference, Porto.

Kealy, L., & Simms, A. (2008). The study of urban form in Ireland. Urban Morphology, 12(1), 37.

Kropf,K. (1996) 'Urban tissue and the character of towns', *Urban Design International,* 1(3), 247-263.

Kropf,K.. (2014) 'Ambiguity in the definition of built form', *Urban Morphology*, 18(1),41-57.

Levy, A. (1999) 'Urban morphology and the problem of the modern urban fabric: some questions for research', *Urban Morphology* 3, 79-85.

Moudon, A.V. (1997) 'Urban morphology as an emerging interdisciplinary field', Urban Morphology 1,3-10.

Oliveira, V.(2013) 'Morpho: a methodology for assessing urban form', Urban Morpholgy 17(1), 21-33.

Slater, T. R. (2001). Planning plots in Grenade-sur-Garonne. Urban Morphology, 5(1), 48-51.

Yu Y. and Akkelies,V.N. (2014) 'Quantitative tools in urban morphology: combining space syntax, spacematrix and mixed-use index in a GIS framework', Urban Morphology, 18(2),97-118.

Zhang L. (2013) 'Urban Plot Characteristics Study: Casing Center District in Nanjing, China', ISUF 20th Conference, Brisbane.

Historical perspective on the green structure development: the cases of Stockholm, Sweden and Xi'an, China

Na Xiu, Maria Ignatieva, Cecil Konijnendijk van den Bosch
Department of Urban and Rural Development, Swedish University of Agricultural Sciences
Department of Urban and Rural Development, Swedish University of Agricultural Sciences
Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences
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Abstract

City structure and connected green structure have seen many different schemes during human history. The gap of understanding between Western and Eastern approaches can impact open space planning currently and in the future. In order to identify how green structure evolved over time and its underlying stream of worldview thinking, this paper selected Stockholm and Xi'an as two cases for a comparative analysis. Comparative study not only enables to clarify an urban morphology that common to other geographical locations but also highlights specific historical, cultural and social contexts characterized own place identity. These two walled cities of Stockholm (although we cannot see the walls today) and Xi'an preserved their historical green structure forms representing development traditions. By studying current understanding of green structural processes in three important stages, cosmology thinking, accompanied with the form evolvement, changed as well from vertical to horizontal, from consociate to antithesis with city structure. This study provides insights and lessons for modern-day management approaches and thoughts of green structure planning.

Introduction

City looks were influenced by differentiated schemes of city planning and green space planning history and it affected the modern green space planning as well. Konijnendijk et al. (2006) noted that current green space planning and management have old roots from regional and historical context. In terms of the two cities, one might think that the history and role of the green structure in urban planning structure in a European city like Stockholm and in an Asian city like Xi'an would be very different. However, behind what we can see from green structure history and when we compares the two cities in the light of the thinking of Yi-Fu Tuan, a geographical scholar with a deep knowledge of both cultures, we can see that there are certain structural similarities related to the way people in both places have tended to structure the organization of the city in terms of cosmological binaries, especially the space of the heavenly cosmos and the place of the organic earth. It is the way we think about the world (world view), the nature (nature view) and human ourselves.

Why we should compare the two cities in West and East with very different contexts? Comparative study not only enables to clarify an urban morphology that common to other geographical locations but also highlights specific historical, cultural and social contexts characterized own place identity (Conzen et al., 2012). As in this globalized world, collaborations and integrations between the two parts are increasingly obvious and it is also common to witness that a growing number of inter- and trans-cultural landscape with both western and eastern characteristics appeared in the world. But from a landscape architect point of view, understanding the essence of regions before communication and cooperation became extremely important for national and cross-boundary inventories and assessments.

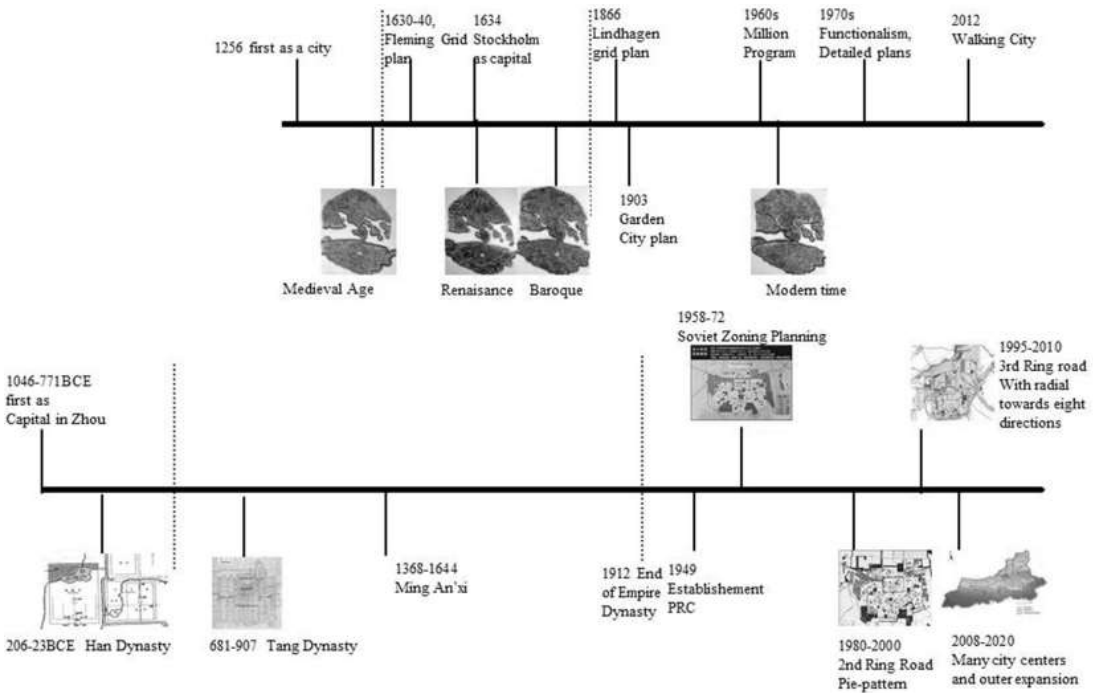
Stockholm and Xi'an are two capital cities in history with fortification walls protected (although in Stockholm we cannot see the walls now). Their grid and hierarchical urban morphology are underpinned as big city pattern in contexts. Both of them are also important commercial routes significant for regional market in many centuries (Viking line in Stockholm and Silk Road in Xi'an). Well-preserved urban sites built in different stages represent how urban form and its underpinning thinking evolved throughout history. Especially in modern time, green structure of Stockholm is serving as a successful model of open space planning. For this sense, Xi'an learned experiences from Stockholm and western world but vibrates from time to time. And nowadays both of them face with new challenges because of urbanization and green spaces destruction.

We suppose that following the traces of green structure history current and future open space planning theory can be benefited from itself on one hand and from its counterpart on the other. So, the purposes of this paper is, firstly to review city and green area planning history of Stockholm and Xi'an from phenomenological and theoretical perspectives, with inclusion of the impact of changing cosmology thinking, and secondly to compare and contrast the similarities and differences for these two cities in order to provide historical grounding and draw lessons enhancing green structure development in different parts of the world.

Framework of comparison

Before proceeding further, it is necessary to define the scope of comparing green structure in two cities. A timeline below shows historical stages of both cities. The scope is described at three key periods indicators: early age (Medieval Age (1050-1550) of Stockholm and Han Dynasty (202BC-220AD) of Xi'an), pre-modern time (1600-1800s Renaissance-Baroque and Tang Dynasty (618-917)), and modern time (1900 afterward of Stockholm and 1911 afterward of Xi'an) (Fig.1). Stockholm was established as a capital city since 1256. Medieval urban form laid its foundation in how Stockholm looks like until Renaissance influenced the whole Europe. When it comes to modern time, Stockholm searched many ways for preserving history and developing urban morphology at the same time. Xi'an, as an old capital city, saw 3000 years' dynastic upheaval. But Han and Tang was the peak of history from society, culture and economy. So these three indicators were representatives of how capital city form changed in Sweden even Europe and China.

Figure 1. Timeline and events of Stockholm and Xi'an, upward is for Stockholm and downward is for Xi'an, Sources: Stockholm in 1590s, 1670s, 1790s and 1880s from Stockholm City Museum (Stadmuseum); layout of Jian Zhang Palace of Xi'an in Han Dynasty: Zhou (1999); Layout of Chang'an City in Tang Dynasty: Lianhu District Archives of Xi'an; Master plan of Xi'an in 1950s, 1980s, 1995-2010, and 2008-2020: Xi'an urban planning and design Bureau



Up-Down view: City and green structure of Medieval Age (1050-1550) of Stockholm and Han Dynasty (202BC-220AD) of Xi'an

In early time, the capital city was indicated according to people's cosmological perception. In Oxford English Dictionary, cosmology is defined as the study of the origin and development of the universe. It often treated as the place where a vertical cosmic order, with the cosmos above and earth below. Cosmology is always transposed to the earth by people-the city-through the mediation of the regent or ruler as the minister of a heavenly god, or gods. Relationship among Heaven, Earth and Human can be explained as a form in China- the dome-liked heaven embraces the vast earth (Fig.2). Absolutely up and down made sense (Tuan, 1974) and the earth occupies the lowest place in the heavenly hierarchy. People, although stand in between heaven and the earth where they comprised the universe, is only a tiny part of the universe. Benevolence of the universe, especially the heaven based Chinese philosophy and also the city structure. In terms of western city structure, another similar theory existed –Vitruvian (Fig.2). The circle and square overlaid within a man's two body action proportion, representing human's middle position in the world. The proportional micro cosmos of man is naturally at the center of the cosmic macro cosmos. The square was a common symbol at the time of the four corners of the earth, and the circle symbolized the encircling cosmos.

Stockholm in Medieval time

In the medieval age, Stockholm consisted only of the Old Town (Fig.2). Inside the fortification, the street pattern inside the medieval city walls was an irregular and dense network (Hall and Källström, 1999). The most exalted architectural expression was the Royal Castle (Kungliga Slottet) and Stockholm Cathedral (Storkyrkan). The cathedral served as a symbolized image of the transcendental relations between the human soul and God in typical European cities (Tuan, 1974). The regent was the minister of the god on the

earth in secular world and the close distance between royal Castle and cathedral shows supreme imperial dignity.

Green spaces were quite rare in the Old Town. The kitchen garden (Slottets Örtagård) at the Royal Castle was the dominating green area (Stahre and Wikström, 1986). Outside the Old Town was the unwrought virgin land – the freeform organic earth with forests, lakes, etc. Green structure was only a tiny piece of functional accessory of the whole city. Wilderness nature was also seen as "evil" which should be bordered from cultivated gardens- the true God's paradise on the earth. Crossed geometrical gardens, with many detailed religious meanings served as grid and neat pattern for corresponding cosmic order as well (Fig.2). So in early time Stockholm applied vertical cosmological order in urban form but the whole city was in free pattern. Green structure inside the city adopted cosmos order with geometry lines to antithesis its city.

Xi'an in Han Dynasty

The pursuit of telepathy between human and heaven occupied a very important position in Han Dynasty and the location and layout of capital city tended to be given some symbolic significance. Xi'an (Chang'an as the old name before 1911) is located in the north of the Qingling Mountains and the south of Wei River. There are other seven rivers going around and combined as the run-off system of Chang'an. The city is surrounded by three sides of water and one side of mountain. From Fengshui (an traditional theory for harmonizing humans and their surroundings) perspective, this pattern is called 安 (an) that means stability and then the city was named Chang'an means long-term stability. It is one of the most suitable places for building the capital city (Han and Zhao, 2010). From ancient astrology perspective, the location corresponds to the main star belt (Ziwei Yuan) as Ziwei (Polaris) centered (Zhao, 2007). Three components- imperial palace, imperial city and outer city- are indispensable in the capital city layout since Imperial Palace stood for Polaris, Imperial City was the main stars (Ziweiyuan) that surrounded Polaris and the Outer City was other stars in the sky. Imperial City and Outer city sitting around the Imperial Palace like the protected stars locating around the Polaris (Zhang, 1987).

In Han Dynasty, Xi'an had another name- Dipper City (or Ladle City). The layout was not strictly clear and neat but substantially in the shape of square which adopted the idea of Modelling Heaven and Making out the capital theory. Northwest part of the fortification was twisted like the Northern Ladle (Big Dipper), the central part of south wall protruded and the eastern part was circuitous like the Southern Ladle, and Weiyang Palace was the Purple Forbidden Enclosure where Polaris sits. According to ancient Chinese astrology, Northern Ladle means stability and order, symbolizing the completed state system and harmony between government and people. Northern Ladle is regarded as the fate of the patron saint. Northern and Southern Ladle embraces blessing and constructing the Ladle City is to obtain heaven's sanctuary and achieve long-term stability. Purple Forbidden Enclosure is the center of heaven and its core is Polaris. Therefore, Polaris is the King Star and the emperor is Polaris.

Green structure in Han was the privileged landscape gardens of royal family, such as Jian Zhang Palace (Fig.2). The main principle was to mimic real nature on the earth into artificial gardens. So the organic green was extended from outside to the formal palace. In terms of water (Taiye Pool) with three hills, is believed where the celestial beings live and shows emperor's hope of immortal life. From an overall view, the green space pattern (gardens) antithesis to the geometrical city, which the arrangement of landscape gardens took a natural and organic way where the earth looks like but the city is regular and geometric where the heaven looks like.

From vertical to horizontal: Green structure of Stockholm 1600-1800s Renaissance-Baroque-Enlightenment and Xi'an in Tang Dynasty (618-917)

Gradually, as the pace of city expedition, absolutely vertical was replaced by horizontal and people's eyes started to look around instead of up and down. In both cities, the built environment was structured geometrically with inspiration from the cosmos surrounded by the organic earth. The organic nature of the earth came to form a green

structure within the geometrical spatial structure of the built environment. A new cosmology thus generated in which the geometric order of the heavenly cosmos provides the basic horizontal planned structure of a city with which the organic green structure is placed. Urban landscape here turned from vertical to horizontal and encompassed by the geometric built environment and the organic green structure (gardens and parks), fields and nature generally (Cosgrove, 1985).

However, there is still a binary structural difference between the geometry of the built environment and the organic green structure in Stockholm and Xi'an. During Renaissance and Baroque times, the green structure was cut so as to have the same geometric and regular forms as the buildings. In the Enlightenment, admittedly at least in part influenced by the Chinese garden, a new organic ideal for parks and gardens developed which was known as the English landscape garden. One example is the Chinese Pavilion of Drottningholm palace in Stockholm. It is clear to see that geometric built pavilion was surrounded by a park in the natural style translated from Chinese garden. This more "natural" style eventually became the dominant model for the landscape of the urban green structure of Stockholm's parks and environs. No longer was the vertical cosmos dominant, with the heavenly geometry above, and the organic place of the earth below. Geometry perspective carried the eye out horizontally through the landscape scene (Cosgrove, 1985, Tuan, 1974). In China, gardens were inspired by the organic nature of the lands encompassing the city. So although horizontal made sense, vertical and organic perspective still came into play. Moreover, from Tang Dynasty on, garden is no longer the privileged belonging to royal family but literal scholars started to express their perception as well. Confucian and Daoism, as the two parts of literal education, play an increasingly larger role in how the garden looks. Nevertheless, the essence of organic natural style did not change and geometric built environment and organic green structure conflicted and opposed.

Renaissance-Baroque-Enlightenment time in Stockholm

Since the 1630s, a Renaissance and Baroque grid plan with the tower of the castle as main direction was drawn up in the south and north of the Old Town- Norrmalm and Södermalm. As a result of the planning ideal in this period, Stockholm has a structure of different grid nets radiating from tower "The Three Crowns" at the center of the Royal Castle. This can be regarded as a boundary line between the more spontaneous way of building during Middle Age and the carefully planned city of the Renaissance (Andersson et al., 1998). And it can be also regarded as a boundary line from vertical world view (Medieval Time) to horizontal one.

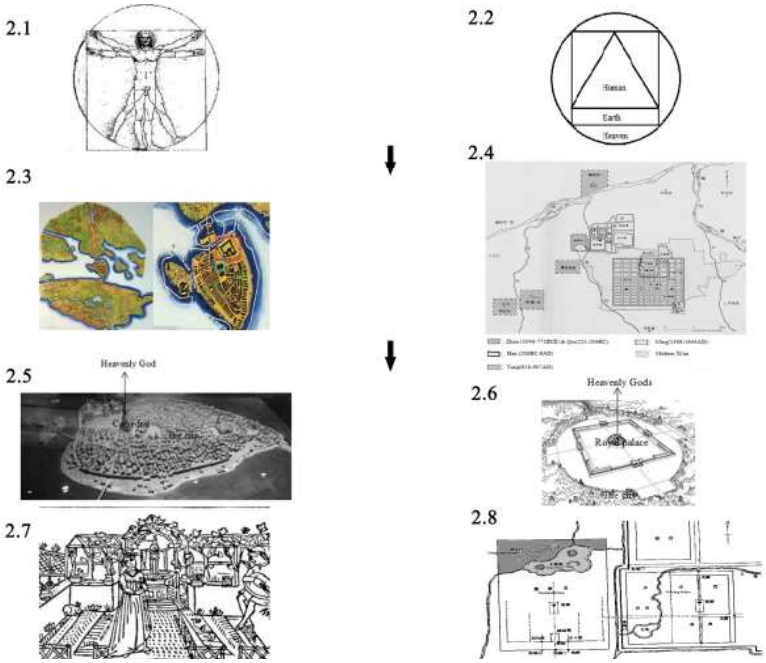
Parts of modern green structure of Stockholm has today is originated from this time especially in Norrmalm, including King's Garden (Kungsträdgården), Hulme Garden or Hop Garden (Humlegården) (Fig.3), and the Royal Gamepark (Kungliga Djurgården). In the end of the 1600s, rule-based geometric lines and axial symmetry are the themes of these gardens. A century later, this pattern has been replaced by Baroque with deliberate and exquisite curve. Furthermore, English park style influenced these gardens in the next one-hundred years and for this time, large scale of impression of nature is the trend.

In 1866, Albert Lindhagen introduced a boulevard system that cut through grid plan (Fig.3). He proposed wide, tree-planted avenues and boulevards as George-Eugène Haussmann's boulevards in Paris. In Norrmalm he proposed the 70 meters wide Sveavägen, as wide and long as the Champs Elysees. In Södermalm, Lindhagen suggested a semi-circular Södra Esplanaden (later Ringvägen) which was a precursor of ring-road in Stockholm (Selling and Lindhagen, 1970). Not only that the boulevards came with planted avenue, but public parks were also added since quite few parks were previously open to the public in Lindhagen's plan. Lindhagen utilized public parks as the starting or ending point of esplanade as well, like the Södra Esplanaden started from Skinnarvik Park until Vita Bergen. Gustav Adolfs Park and Nobel Park are the ending points of Karlavägen and Strandvägen.

Green Structure of Xi'an in Tang Dynasty

Xi'an in Tang Dynasty was the combination of the passage in the Kaogongji (Record of Trades) section of the classical layout of capital cities, ancient Chinese astrology, Fengshui,

Figure 2. Vertical cosmology theory and its interpretation into city and green structure of Stockholm and Xi'an, 2.1 is Vitruvian that completed in 1490 by Leonardo da Vinci. The circle and square overlaid within a man's two body action proportion, representing human's middle position in the world from online library of Stanford University. And 2.2 is Canopyheaven theory, which is one of the ancient Chinese cosmologies, thinks heaven is dome-liked, embracing the rectangular earth. Human being is in between of them. Depicted by the author from literature.
2.3 is Stockholm in 1590s, location of Royal Castle and the Cathedral in the Old Town. 2.5 is the cosmological thinking between heaven, cathedral, royal Castle and city and 2.7 is its geometrical green structure. The red square is Royal Castle, the Blue one is the Cathedral and the green ones are the two markets location where the goods can be exchanged, Source: 2.3 is from Stadsmuseum of Stockholm and 2.5 is from Stockholm Medieval Museum (photo and noted by the author) and 2.7 is from http://www.gallowglass.org/jadwiga/herbs/medievalgardens.htm
2.4 is locations and layout of Xi'an in Zhou, Qin, Han, Tang, Ming and modern time. Source: Yu (2009). 2.6 is the layout of Jian Zhang Palace in Han Dynasty and 2.8 is the cosmos order between heaven, royal palace and the city , Source: 2.6 is from Zhou (1999), modified by the author and 2.8 is from Shiren (1963) explained by the author



Confucian and Daoism. 8310 ha of area was organized by clearly articulated and directed spaces, confined by geometric shapes for within and outside walls (Fig.3). It was formed by the Outer city (108 neighborhoods and 2 business markets), Imperial Palace (location of the emperor's residence and the residence of his closest family members as well as his main hall of audience) and Imperial City (housed important offices and bureaus) (Steinhardt, 1986). Establishment of the central axis is to emphasize the centrality of feudal emperors and symmetrical layout is to reflect the strict order and hierarchy. Road system is spread out along the central axis line symmetrically to form a weft crossover style network and every gate faces the main road straightly and thus bridges the road outside the city. A temple stands to the east of the city for memorizing the imperial ancestors, alters to soil and grain to the west.

From ancient astrology perspective, 108 neighborhoods of Outer City symbolized 108 main. 13 rows of residential areas stood for 13 months of a year, including the intercalary month and 4 lines of neighborhoods in the south of Imperial City corresponded four seasons of a year. Oriented north and facing south, as an important principle of Fengshui theory, was not only a reflection of layout guiding ideology but also intended to embody the supreme imperial dignity. The names of main Gates in four directions were also from

Fengshui- Azure Dragon, White Tiger, Red Bird and Black Tortoise (four Emblems) are according to their directions in the sky (Mak and Thomas Ng, 2005, Dingzeng, 1998).

Green structure existed as gardens (royal and scholar gardens) and boulevards (street trees or planting trees along streets and roads). Apart from royal family, literal scholars started to design their gardens as well. But both royal and scholar gardens were still inspired by the organic nature of the lands encompassing the city which followed its ancestors from Han dynasty (Fig.3). Geometric built environment was still antithesis with organic earth as what they did before. In terms of street tree planting, people believed that it is a good moral behavior and a blessing to the locals. It became state law and a special state office assigned to manage and maintain the road greenery. Their contribution to the construction and maintenance of boulevards were recognized and memorized (Yu et al., 2006, Wang, 1955).

Place and Space: modern green structure in Stockholm 1900- and Xi'an 1911-

During the modernist era, the city planners, inspired for example by Le Corbusier combined plans for a geometric built structure with a more organic green structure, along the lines of the natural Anglo-Chinese garden in Stockholm. Even though there is no longer a cosmos dominated by the horizontal relationship between earth and sky, there is still a binary between the geometric spatial organization of the built environment, and the organic character of the green structure. However, Chinese modern green structure experienced a vibrated path since China continues its dynastic way for more than 3000 years until it was knocked on the door by western thinking and technology. Traditional theories lost in several decades but many western theories imported without any adaption. Xi'an went through from zoning theory, Soviet model to self-positioning (ancient city) and fusion of traditional and western theories. The boundary between Western and Eastern green structure is blurring but the conflicts between geometric built environment and organic green structure tensed.

Nowadays, the densification of the built environment threatens the organic green structure which was key to functionalist planning. The conflicts of geometric built environment and organic green structure we tend to see today exists in both Stockholm and Xi'an between those who favor the spatial organization of the built environment, and those who are reducing the area of the green structure through densification, and those who argue giving more priority to the green structure of the landscape when designing cities (Whiston Spirn, 2005).

Modernism and Functionalism in Stockholm

Many different aimed and systematic city plans were formulated throughout the whole 1900s in Stockholm focusing on much more outer spaces. Garden City of Stockholm (Trädgårdsstäder i Stockholm) is the campaign that large parts of the outer areas of Stockholm were built on with houses by citizens themselves. People's Park (folkpark) is the main movement aimed at finding a way for the working class to get out into nature from crowded housing in the city. Park and green space were no longer the exclusive privilege of royal family and nobles but access to normal people's options of culture, lectures and entertainment.

Functionalism in architecture and planning had its breakthrough in the early 1930s and then implemented in a wide range of urban plans, including the northern and southern Ängby, Traneberg, Midsommarkransen and Hammarbyhöjden. Vällingby is the example of neighbourhood unit planning in 1950s that planned to have housing, services and workplaces for its habitants, but all separated by function (Fig.4). Green structure in the modernist era shared the idea that every park should have a new and functional content. The functionalist view was to keep and follow natural organic way that the parks and other green structure turned to nature as the source of their form instead of untouched territory and counterbalance of garden design. The healing powers of nature were considered more important than the pleasures gained by the bourgeoisie from having a pleasant place to stroll (Andersson, 1940). Since late 1970s, functionalist ideal embossed in Stockholm urban planning and detailed city plans have been set out and realized, such as Kista (1977-1980), Skarpnäcks gård (1980s) and South Station area (Södra Stationsområdet) (1986-1990). The updated comprehensive plan for Stockholm is called "the Walkable City" (Promenadstaden)" which was approved in 2012 and aimed for sustainable growth and

letting the city to grow far beyond the boundary. Green structure now has more ingredients than any other time with focus to a wider sense and territory. Absolute top-down cosmos is replaced by learning from nature, from organic earth in a horizontal sense.

From the first public park to modern green space planning of Xi'an 1911 to present

The starting point of modern planning of Xi'an was accomplished in 1927 since the end of feudal society in 1911. After that, many different theories influenced green structure planning of Xi'an. The first one was unadjusted zoning city plan which divided the city as different zones, such as ancient, administration, commercial, industrial, agricultural and scenery areas (Long, 2010) imported Swiss architect Le Corbusier's Athens Charter. Green structure, on the side, was employed by Soviet Union that public parks became a part of civic construction and were regarded as an effective tool for the government to cultivate civilized manners (Shi, 1998). Revolution Park (accomplished in 1927) was the first specially designed park of Xi'an for commemoration of soldiers and civilians dead in the war.

After the establishment of People's Republic of China (PRC in 1949), green structure plan companied with urban plans witnessed close association of political and economic campaign of the country, for example, the first master plan (1953-1972) took the typical Soviet model- the Park of Culture and Recreation theory-green spaces for working class (Zhao, 2009). The second master plan (1980-2000) divided the resident areas as three scales- district, street office and neighborhood (the inherent of long history of neighborhood management from feudal society). The third master plan (1995-2010) aimed at sorting out wider new space of urban development instead of the original inner city and constructing an environmental protection system. Park construction began to take citizen's need into consideration, such as Fangzhi Park (Textile Park) in 1994 is the first park constructed in the industrialized area that for recreation of ordinary working people. City Sports Park in 2004 is the park that aims at encouraging outside sports and improving physical health of citizens.

The ongoing fourth plan (2008-2020) is the comprehensive plan includes two parts as regional and city plans, separately. Ancient city is no longer the only one center of the city but there will be other four centers as well. Connection and co-development of urban and rural areas are the main emphasis with ecological preservation. Green space planning and management are one of the important parts that will be shared by all the residents and contain more contexts rather than park construction, such as neighborhood green space, road greenery, and productive green space (nurseries provided for city greenery) etc.

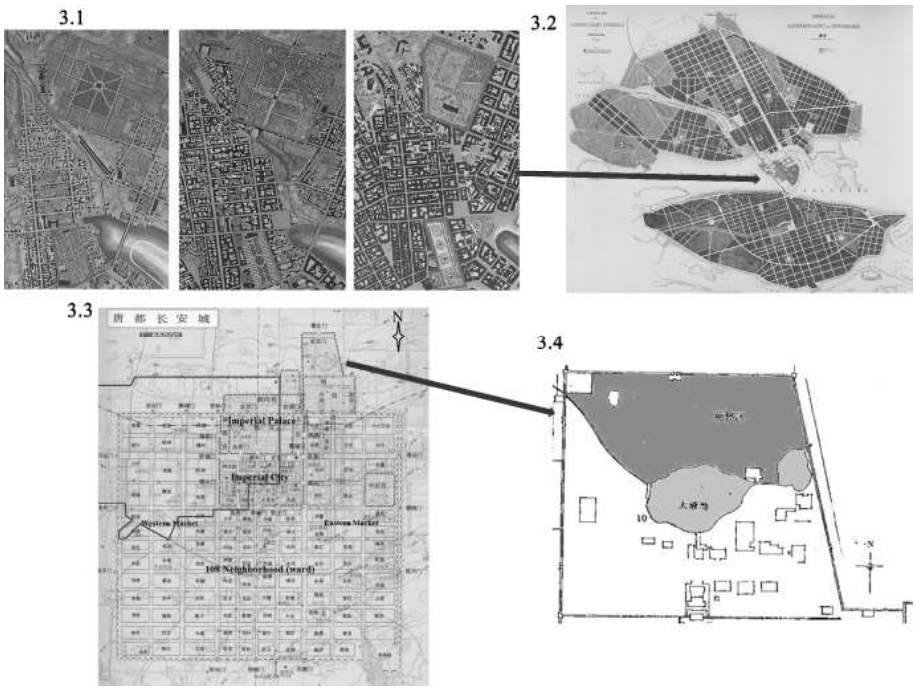
Discussion

Although both regions experienced a different way of evolvement, several concepts are shared, such as nature, world, place and space. World view is a fundamental cognition toward a wide world perception. It is the framework of ideas and thinking formed in an individual, a group or a nation's culture. It interprets into how a city looks like and how people interrelate with it. Nature view (view of nature) is usually evolved with the development of world view, since nature refers to the phenomenon of the physical world around us which is a part of the world we view. Nature view is always an expression through the relationship between human and nature. It leads to how people recognize and utilize this world- world view- at the same time. Tuan (1974) noted that the city is a symbol of the cosmos and how a city looks is precisely what the man considers this world.

In early time both cities served as the similar pattern- square. Although some one may argue that the Old Town of Stockholm is not a precise square shape, it is mainly as a result of the geographic shape of island. If we take a closer eye on how the two cities form- royal Castle (with cathedral) stands for ordered life, two markets and other resident areas represents material property and the fortification walls (security from enemies)-they are the same.

In terms of world view and nature view, both Sweden and China experienced the axial transformation - from vertical to horizontal. In Sweden (Medieval Age) and China (Emperor Dynasties), cathedral and royal castle took the dominating role in a city. However, both of them are human's interpretation for the relation between heaven, earth and human beings- a world view of vertical where cosmology works. In Stockholm, cos-

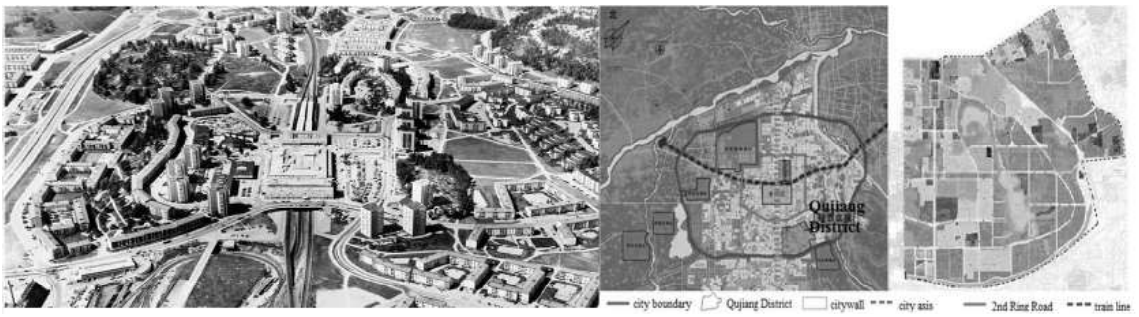
Figure 3. Horizontal cosmology into the city and green structure. 3.1 is layout of King's Garden and Humle Garden in the 1670s (on the left), 1790s (in the middle) and 1880s (on the right), the bottom is King's Garden and the upper is Humle Garden, source: Stockholm stadmuseum. 3.2 is Albert Lindhagens generalplan from 1866 för Norrmalm, Södermalm och Kungsholmen. The black part is for built environment and the grey part is for its green structure (gardens and parks). Source: Selling and Lindhagen (1970).
3.3 is layout of Chang'an City in Tang Dynasty, Source: Lianhu District Archives of Xi'an. And 3.4 is Layout of Daming Palace in Tang dynasty for geometrical built environment is surrounded by organic green. Source: Zhou (1999), modified by the author



mology is illustrated through the hierarchy of the cathedral, the royal Castle and then the city. However, in Chinese cosmology it was demonstrated through the entire city- not one specific part- indicates another philosophy- there are more than one God. It can be saw clearly in that no matter which dynasty, the God of heaven, the God of earth, the God of Grains and ancestors must be indispensable part. The power of emperors is given by the Heaven instead of one single God. From another perspective, it is precisely as a result of people's reverence of nature and human's tiny knowledge and strength in front of nature, world view was confined in vertical.

Since the Renaissance in Stockholm and Tang Dynasty in China, the position of human were increasingly recognized and human's world view changed from vertical to horizontal accordingly. In Stockholm, people started to explore outer area (Norrmalm and Södermalm) of Old Town with dedicated intention that grid pattern shows clear order and also the regent's position (Sveavägen in Norrmalm was supposed to link the royal Castle and Haga Park) as a mediator between the heavens and earth (Benveniste et al., 1973) - which is exactly the same manifestation of meaning of Chinese imperial palace and Chinese cosmology. In terms of the Old City (Stockholm), although tiny planning efforts applied, no substantive changes happened that the Royal Castle and cathedral still sat in the same location and served with the same functions. However, in Tang Dynasty, grid pattern was utilized as well from a huge scale using vertical and horizontal road systems as the boundary. The consideration of grid netting is not only to show order and hierarchy but also the basic Confucian philosophy (4-5th BCE) - nothing can be accomplished without norms or standards- grid is the standard. As for landscape gardens, humble literal-minded scholars have the similar right as royal family to plan and design

Figure 3. Modern cosmology – tensed geometrical built environment and green structure, the left is Vällingby town center, 1954 from Stockholm Stadmuseet. And the right is Qujiang District in Xi'an by the author.



in suburban areas of city (Wangchuan Garden for example). People's world view was changed to horizontal as well accordingly. But if we take a closer eye on the imperial city and imperial palaces, they are still the interpretation of heaven and human, they still follow the basic rules of ancient astrology (Polaris, Alphard and other stars). So, both vertical and horizontal views exist in Renaissance and Tang, but again, with different expressions because both of the two periods were inherited from their pioneer (Renaissance from Medieval and Tang from Han). Both of their ancestors left marks on the green structure.

At modern time, the exploration of urban spaces continues and as same as the scientific thinking and explanation. It means that the world view is pivoted to the environment surrounding and more and more horizontal space is focused. However, the essence of Chinese society- an agricultural society- does not change. Fengshui theory and Daoism, which were concluded through natural observation in 4000 years, are still applying in harmonizing the human with the surrounding environment. It backups the planning and design of Xi'an in every dynasties and lays the foundation form of modern Xi'an. Like the current regional plan of Qujiang District (south part of Xi'an based on the ruins of the same area), a series of waters combined with parks with traditional characters were included as the central green structure of the area. From Fengshui perspective, whether a piece of land can sustain rely on water. In Qujiang, water locates the core and becomes the fundamental element of flowing energetic air. What the plan tried is to harmonize water, green space, built environment together and create naturalism although artificial-main point from Daoism on how a garden should look like. However, it is clear to see how western approaches influence. Zoning plan is the main method in Xi'an and it divided the district as several zones for: tourism, commerce, residence, culture, education, etc. A great area of lawn is popular used almost everywhere in this region which is never appeared in its history ever. Whether these are the real need for a region with historical relics is an issue (Fig.4).

Another significant similarity and also difference is symbolic meaning of the geometric built environment and organic green structure. As what we saw above, as a symbol of cosmos, city always takes geometric shape as its representation. In Sweden, this idea corresponds to the heavenly city in the Bible and the Garden of Eden (geometric city form and organic green structure). In China, this idea follows ancient astrology that city represents exactly the heaven and green structure is what the earth seems. Hence, green structure is originated antithesis or consociate of the city in both sides and the different perception towards nature is the starting point of how green structure evolved. Tuan (1974) argued that rectilinear geometry comprised the city and natural lines and spaces were the main theme of the garden. In China rigid geometry line shows hierarchy and order but natural lines illustrate complicated informality which integrates human with their surroundings- which is also the basic philosophy of Daoism. Everyone is equal when he enters a garden and he is free to contemplate and commune with nature without considering social distinctions. Seeing is not only an aesthetic but also intellectual activity that everyone can be obsessed. When he walks along the trail, he is exposed to be

involved and encompassed with the garden through constantly shifting scenes.

However, in the Medieval Ages of Sweden, gardens were places for contemplation and provide fruits, vegetables, and herbs for the monastic community. There was usually a fountain at its center with rising out of water symbolized the geography of Eden in Bible and life of the Christ. They were not for pleasant scenery but always for Christian tradition: white lilies stand for purity, red roses are love, and the table in the garden with apples suggests human's sin by Christ (Landsberg, 2003). As the pace of human's powers were manifested in Renaissance and onward, the symbolic and multi-dimensional significance of garden became more and more difficult to read and the garden started to emerge with geometrical city lines. One noticeable example is the Humle Garden that in 1670s (Renaissance and Baroque time in Sweden) emphasized on privileged views by means of straight paths, rows of trees, and linear ponds. They were places that people can seek for pleasant views and also flattering the human ego- overcoming difficulties and manifesting human powers- where is also a supportive evidence from vertical to horizontal world view. In the next century, pursuing of natural beauty is the mainstream of green structure and was embodied in manor gardens. Geometric lines of boulevards, planting and neatly built pond were replaced by natural pastures, dominating by grassland, natural growing trees, meandering streams and ponds. Deeper, more twists and more poetic views were explored for romantic temperament (Tuan, 1974). It is the time that human recognizes nature's power again and implicates it into his surroundings. And English romantic garden is the first time that Chinese and European garden get close (although it was influenced by Chinese garden in part, we still need to admit why the influential factor can be achieved is that people re-recognized and re-evaluated nature again) - where nature is the meeting point.

Conclusion

As the step of modern urbanization, multiple meaning of garden faded and human's power was exaggerated again. Human exploited earth as much as they could for horizontal exploration but no consideration of naturalness. Until recently (after WWII), garden, park or other kinds of green structure came into horizon as places that for human activities on one hand and for natural connection on the other. However, Sweden and China took a seemingly similar but indeed different way. In Stockholm, functionalist planning and design (Le Corbusier's Contemporary City for example) admit the contrast between the geometry of the buildings and roads, and the organic shape of green structure. Le Corbusier recognizes the value of geometric shapes and also uses green structure with geometric shapes to penetrate the elevated buildings. This idea goes along the line of Anglo-Chinese garden in the case of geometric built environment and irregular organic green structure, appreciate their value and meaning and utilize green structure as a plastic factor to go through the geometric buildings. Moreover, green structure is more and more explained and recognized by different significances after Modernism and Functionism, with its organic shapes. So it is obvious to see that an increasing number of green structures is realized and worked as its natural functions- constructing nature (Spirn, 1996). However, in China, we are kind of losing our recognition that we had in ancient time but imported many western approaches without any adaption, for instance large area of turf even in arid cities, which never appears in any Chinese landscape history. Messed up phenomenon exists since modern and traditional garden theory conflicts and the concept of Landscape was not even appeared before Modernism knocked at the door. Even until now, functionalism is still freshness in China. Although a lot of discussions keep on going for direction of Chinese future landscape and city planning between traditional theory, western models and balanced fusion, trying to conclude the clear definition of Landscape in China is the foremost question. And it is what Chinese landscape scholars need to answer and maybe green structure history of Stockholm could give us some hints. Similarly, Stockholm also faces with the tensed conflicts between geometric built environment and organic green structure, between different groups favor different priorities. Re-examination and re-sorting of green structure history would provide some cues for current and future city planners.

References

Andersson, M., Monastra, N. and Pardon, W. M. (1998) *Stockholm's annual rings: a glimpse into the development of the city,* (Stockholmia förlag, Stockholm).
Andersson, T. (1940) 'To Erase the Garden: Modernity in the Swedish Garden and Landscape', *The Architecture of Landscape*, 1960, 2-27.
Benveniste, E., Lallot, J. and Palmer, E. (1973) *Indo-European language and society,* (University of Miami Press, Miami).
Conzen, M. P., Gu, K. and Whitehand, J. (2012) 'Comparing traditional urban form in China and Europe: A fringe-belt approach', *Urban Geography*, 33, 22-45.
Cosgrove, D. (1985) 'Prospect, perspective and the evolution of the landscape idea', *Transactions of the Institute of British Geographers*, 45-62.
Dingzeng, A. (1998) Outlines of Feng Shui: The origin of Chinese architectural anthropology, (Garden City Cultural Press, Taiwan).
Hall, T. and Källström, G. (1999) *Huvudstad i omvandling: Stockholms planering och utbyggnad under 700 år:[stadens uppkomst på 1200-talet, stormaktstidens stadsomvandling, 1800-talets alléstad, 1900-talets cityreglering],* (Sveriges radio).
Han, H. L. and Zhao, X. F. (2010) 'The Four Emblematic Symbols in Ancient Chinese Astronomy and Their Influences on Capital Planning in Ancient China', *Architecture and Environment,* 188-191.
Konijnendijk, C. C., Ricard, R. M., Kenney, A. and Randrup, T. B. (2006) 'Defining urban forestry–A comparative perspective of North America and Europe', *Urban Forestry & Urban Greening,* 4, 93-103.
Landsberg, S. (2003) *The medieval garden,* (University of Toronto Press, Toronto).
Long, X. F. (2010) 'The enlightment and the change of all previous master plan concepts in Xi'an', *Planner* 26, 40-45.
Mak, M. Y. and Thomas Ng, S. (2005) 'The art and science of Feng Shui—a study on architects' perception', *Building and Environment*, 40, 427-434.
Selling, G. and Lindhagen, C. A. (1970) *Esplanadsystemet och Albert Lindhagen: stadsplanering i Stockholm åren 1857-1887,* (Stadsarkivet, Almqvist & Wiksell (distr.)).
Shi, M. (1998) 'From imperial gardens to public parks: The transformation of urban space in early twentieth-century Beijing', *Modern China,* 24, 219-254.
Spirn, A. W. (1996) 'Constructing nature: the legacy of Frederick Law Olmsted', *Uncommon ground: Rethinking the human place in nature,* 91-113.
Stahre, N.-G. and Wikström, J. (1986) *Ortnamn i Stockholms skärgård,* (AWE/Geber).
Steinhardt, N. S. (1986) 'Why were Chang'an and Beijing so Different?', *The Journal of the Society of Architectural Historians*, 339-357.
Tuan, Y.-F. (1974) Topophilia: *A study of environmental perception, attitudes, and values,* (Columbia University Press, Columbia).
Wang, P. (1955) *Tang Huiyao (record or social backgrounds of Tang dynasty)*, (Zhonghua Book Company, Beijing).
Whiston Spirn, A. (2005) 'Restoring Mill Creek: landscape literacy, environmental justice and city planning and design', *Landscape Research,* 30, 395-413.
Yu, K. J., Li, D. H. and Li, N. Y. (2006) 'The evolution of Greenways in China', *Landscape and Urban Planning,* 76, 223-239.
Zhang, Y. L. (1987) *Chang'an City of Tang Dynasty*, (Northwestern University Press, Xi'an).
Zhao, A. Q. (2007) 'A brief study on the theory of site selection and construction of Chang'an, the capital of the Tang Dynasty', *Journal of Xi'an University of Architecture and Technology (Natural Science Edition),* 5, 671-675.
Zhao, J., J. (2009) 'Sixty years of landscape policies and development in China (2): Soviet Experiences', Landscape Architecture 2, 98-102.
Shiren, W. (1963) 'Speculation of ritual architectures in the southern suburbs of Chang'an, Han Dynasty', *Archeology*, 9, 006.
Yu, M. H. (2009) *City wall, Bell And Drum Tower of Xi'an: history, art and science,* (Xi'an Jiaotong University Press, Xi'an).
Zhou, W. Q. (1999) *Chinese Classical Garden History,* (Tsinghua University Press Ltd., Beijing).

Healthy and sustainable cities: communication of an identity and its implications for the city to be deemed an organism and a field

Paula V. Carnevale Vianna, Sanmya F. Tajra
Urban and Regional Planning PHD Program, Univap - Universidade do Vale do Paraíba, Brazil
Keywords: City, autopoiesis, field, healthy city, sustainable city

Abstract

This article aims to analyze cities as a living organism based on Maturana's theory of autopoiesis and as a field of dispute, as conceptualized by Bourdieu, in order to understand the reasons and also the outcomes of the voluntary and political process of implementing sustainable and healthy cities. The cities, taken as biologic social phenomenon are continuously evolving as a result of interaction of the cities elements with the external and internal environment. Several and different actors, for different reasons and purposes, put the city in motion, making this known to others by means of multiple languages and signs translated into the multiple identities that comprise the contemporary cities. Denominations may create or consolidate urban identities - bike-friendly, age-friendly, child-friendly cities; business cities; resilient cities etc. According to the theory of autopoiesis, such changes occur within operational limits that may be broken eventually, thus opening the closed system and leading to a new autopoiesis process. Denominations, however, are political process, of symbolic value, operated by actors and social bodies positioned in different fields. Once established, the sustainable/healthy city acts as a symbolic system, simultaneously structured and forging the structure of certain way of perceiving, planning and acting over the urban form. This process implies dispute, which is not clearly seen within the organic concept of cities. Considering the city as a body may conceal the significant social and cultural differences that mark the urban tissue of less developed countries. This paper aims to compare both theories by using the movement of sustainable and healthy cities.

Introduction

This article suggests cities can be analyzed as living organisms, as stated by Maturana's theory of autopoiesis (1977), and as a field of dispute, as conceptualized by Bourdieu (1989), as well as the use of such theories to analyze the voluntary, political process of implementing sustainable and healthy cities. Autopoietic cities are supposed to be live, dynamic organisms, of complex and relational structure. According to Bourdieu's framework the relational field is one of dispute, one in which agents occupying different hierarchical positions relate with and confront each other. The identity of cities, as autopoietic systems, would be defined and maintained by the complex relation of their constitutive elements. In both theories, cognitive and communicative dimensions are paramount in the identification process.

In this paper "identification processes" (Hall et al, 2005) are considered within their collective, urban dimension. According to Woodward (2003), cities, in the capitalist system, currently create and display their identification through marketing and self-promotional communication strategies that allow for privileged insertion into the global system, in terms of both the economic and social realms. To the author, communication technologies, constitutive of social relations, must be considered, in current cities, from a triadic dimension: material, significational (sociocultural) and relational.

A myriad of sociopolitical movements currently communicate and propose the qualification of cities. Those movements create ideal types for the urban way of living, to which specific titles that communicate and symbolize the desired identity, are conceived: resilient cities, friendly cities (bike-, age-, child-friendly), healthy and sustainable cities.

This paper proposes those movements as identification processes that result and simultaneously maintain the autopoiesis of different cities; the output of a complex social field which they reflexively influence. The paper is outlined considering four items: the first one explores the concept of city as a living organism based on Maturana's (1977) theory of autopoiesis; the second one dialogues with this concept in its relational aspect, using Bourdieu's field theory and the construction of urbanism as a symbolic system (Bourdieu, 1989); the third one briefly deals with the identity issue in contemporary cities; the fourth item suggests healthy and sustainable cities can be analyzed having the theories as background.

The cities: autopoietic 'living' organisms

Urbanism ontogenically compares cities with living organisms. As knowledge and practice, urbanism came about, within the determinist scientific context, to order, sanitize, cure and embellish the rotten bodies of the industrial cities. (Outes & Miura, 2003) Sennet (1996) developed this metaphor philosophically and aesthetically within a historical perspective, perceiving cities as the body and human systems, and explaining many of its phenomena through the organic metaphor - traffic routes, for instance, would mimic the circulatory system, and the movement would flow through its roads as blood in the veins. Chicago School pioneer urban sociologists in the early 20th century considered urban development from an evolutionary Darwinist standpoint, in which a mapped urban tissue, scrutinized by means of statistical analysis revealed itself as a product of reproduction and competition, the principles that command biological life. (Park, Burgess, McKenzie, 1925)

Cities are considered herein as dynamic and autonomous organisms that adapt to the internal and external environment, in a permanent state of changes, creating their identity by means of continuous and circular interactions, and are kept alive in their autopoiesis. Autopoiesis, theory developed by cognitive biologists Maturana and Varela in the 70s, is marked by the complexity theory frame, explains living organisms based on a network of elements production in which such elements produce the circular systems from which they are created and defined (Maturana, 1997). In other words, autopoiesis breaks with the theory of evolution, by explaining living beings as systems of circular organization. Such circularity preserves them and is maintained by complex relations generated by its component elements. The circular movement takes place within an

operational limit; it is in a constant state of transformation and such characteristics should be observed within a given time frame. The boundary of action, despite characterizing the organism as a closed system, subject to observation, that preserves its organization as well as the elements features, is permeable and interacts with the external environment. The external environment can disturb the internal environment and trigger reactions for change; such reactions however, take place within the operating closure of the system in such a way as to preserve the autopoiesis of the organism structure.

A few authors advocated the use of the theory of autopoiesis, or, more properly, of self-sustainable systems, to analyze urban phenomena. Portugali, in a 1997 essay, characterized self-sustainable systems as being the ones that are simultaneously open and closed, capable of reorganizing the internal framework regardless of external causes and of showing phenomena of non-linearity, instability, fractal and chaos. The author had already associated such phenomena with the sense of life in the 20th century cities, and identified the potential use of systemic theories to analyze the urban phenomenon (Portugali, 1997)

In the 90s, Luhmann adapted the theory to the field of applied social sciences. To Luhmann (apud Seidl, 2004), self-sustainable systems are not exclusive of living beings, but can also be found in the psychic and social systems. In the autopoietic social system, Luhman assigns the cognitive, communicable dimension, a dominant role, classifying it as the very basis of the social reproduction of those systems.

In urban sociology, Vardy (2009) used the theory of self-organized systems to analyze urban social movements. The author analyzed the role of three different "self-organized" social movements and observed the manner in which collective processes, of defined identity, relational and delimited by an operative closure, were capable of occupying in a material and symbolic fashion, public spaces, renewing the political agenda and generating new urban identities.

Therefore, although the use of the theory of autopoiesis in the study of urban form and identification is not original, we suggest a new analysis of the cities as living systems. After all, as Maturana & Varela (1995, page 26) state 'creation is always a new stage, however built from 'old' materials' and 'an explanation is always a proposition that reformulates or recreates the observations of a phenomenon within a system of concepts that are acceptable to a group of people that share a valid criterion' (page 70).

Analysis of cities as autopoietic systems, is based on the cities compliance with the core postulates of the autopoieses theory: the city is built from the relations among its elements, relations that are reflexive, output and product of social interactions, forming interaction networks that establish their limits of operation: a city as an organized system will not exist unless there are relations among its elements. Such relations vary from city to city, distinguishing one from the other and making them reinforce their unit, their self-reference or their identity. Such dynamicity of relations among the components of a living organism in a continuous network of interaction is what defines an autopoietic organization.

Relations take place in the urban spaces within the borders that define the city territory. The border is the limit of operations that circumscribes the extension of its network of transformations while also characterizing it as a unit, granting it an identity. Should such border and limit not exist, the organization's identity would disintegrate and would not form such a discreet unit as a city. The boundaries are nevertheless permeable to the external environment, allowing exchange that may lead to internal changes and renewal, whereas identity is maintained.

At which moment is it possible to say that a city becomes an autopoietic organism? It may not be possible to identify the moment and place that characterized it as such, but one can infer that such state results from the relations that successively occurred among its elements, within a limit of operations. Such relations form the history of the cities and provide them with their identity. Like in Maturana's theory of autopoiesis, the identity is communicated and can be perceived by other living organisms; it can even be copied and adapted to a new context; however, the new information forms and identifies an organization that differs from the one it was copied from. This new city will carry, in its ontogenesis, the marks of the structural changes.

What would the elements that comprise a city as an autopoietic system be? Based on the urbanism literature, we suggest four elements: physical (urban morphology); socioeconomic; cultural/historical; and symbolic elements. The relations among such elements take place through politics, forming the urban unit, whose identity is communicated to and by the individuals that form it.

The denominated city: a process of dispute

To Pierre Bourdieu (1989), the world is understood through cognitive systems. The symbolic systems are tools of knowledge and communication, simultaneously structured (they have a specific logic of production) and structuring (they create representations of the objects). We propose urbanism, as a discourse for and on the city, should be understood as a symbolic system, produced by a body of specialists that, based on science and technique, legitimates a given discourse on the urban. To Bourdieu, the taxonomy and classification systems thus legitimated create an ideological effect, in which the relations of power are depicted as relations of meaning, within a displacement process.

As knowledge production, urbanism is a field of dispute and power, in which different projects, formulated, enunciated and understood by agents that occupy different hierarchic positions, compete to become socially legitimate. The agents' hierarchic positions are defined by the capital they amass in the four dimensions that comprise the social field: economic, social, cultural and symbolic (Bourdieu, 1989). The set of distributions of the agents' different assets establishes the relations of power among them and is materialized in 'socially recognized or legally guaranteed social statuses, among social agents objectively defined by their position in these relations; it determines the actual or potential powers within the different fields and the chances of access to the specific profits they offer' (Bourdieu, 1985)

To Bourdieu (1985) denominating is an act of power. Although in a different context, Bourdieu stated that titles are a symbolic capital, that denominating means defining an identity and that this is a political process and an action of power, outcome of a field of dispute, in which the agents themselves matter less than the relations they establish among themselves. In the social world taken as a field of power and multidimensional space, the one that holds a set of properties active in the social universe at issue, at a given moment, holds strength and power (Bourdieu, 1985). Thus, qualifying and denominating a city can reveal a set of provisions that reinforce a certain self-reference - or, going back to Maturana and Luhmann, maintain the system unit that is renewed in its autopoiesis and perpetuates itself founded on a communicative process.

The urban identification process

Considered from the autopoietic perspective, a city's identity would be created by the history experienced by every one of its members and agents, resulting from the experience collectively built. The historical changes of a living organism make up its identity, a process that is built up rather than natural: the definition of the urban identity(ies) involves choice, selection, excerption of ontogenic information. In the theory of autopoiesis, if a city is to keep its identity it must preserve its operations within the limits observed. Furthermore, it should keep all occurred interactions compatible and adapt itself in the face of external disturbances, maintaining the unit that stems from the multiple interdependence of its elements. Is it possible to define an identity for a city? Although the cities are polysemic and hold multiple identities, there is, generally speaking, an identifiable reference communicated by each one of them, which provides them with unity and distinguishes them from the others. Based on Freitag (2012) analysis, we propose such identity arises from recurrent relations among the physical (the urban form); socioeconomic; cultural and historical elements, furthermore adding the symbolic dimension, given the relevance of such dimension in Bourdieu's analyses and in several urban theories.

Elements of a city as an autopoietic organism and the qualified cities

To explain a city as a living system, with an identity that defines it, we will use the four above mentioned elements or essential fields: physical, socioeconomic, cultural historical and symbolical, which are in a constant state of interactions promoting recurrent modifications among themselves through the agents that live and move in those spaces.

The spatial delimitation of the analysis, in this essay, is the legal definition of the cities' territories, established in the maps and geographic charts. The physical border is also the limit of operations, defining the operational closure which will provide the reference to the system's identity.

In analyzing a city's identity, delimitation of the operation space is pivotal to characterize its elements and the relations among them; reinforcing that the limit is open to the external environment, featuring a system that is simultaneously open and closed (Maturana and Varela, 1977). Besides such delimitation, the elements that form the identity of a city - its shape, culture, socioeconomic, cultural, historical and symbolic aspects - may be independently analyzed.

The cities' shape is the framework of social relations, as well as the materialization and the discourse of its historical path. People take possession of the space, inscribe their values in it and transform it. As Lefebvre argued, the city is the very displacement of time and must be organized having man as its foundation. (Lefebvre, 1977).

The city's culture and history are here also understood in a live and dynamic form. To Barth (2005) culture is characterized as a 'state of constant flow, stagnation of the cultural materials not being possible, because they are constantly being generated as they are induced and as a result of people's experiences'. This cultural materials dynamics keep the culture alive by adaptation processes, whether by a process of evolution of the social relations of the group of people that form them, or by their relations with elements of other cultures.

Social relations and their constant interactions, form an additional urban system element – the relations network. Sociability produces different stories, based on experiences, exchanges and beliefs. The experiences lived by the individuals bring about different social relations that, in turn, give rise, in a very same city, to different identities. We may consider that all those identities are somehow interconnected as a processes network, and create a social system that holds several other social systems (Maturana, 1997). A relevant system is the economic one, outcome of the recurrent and circular relations between production and distribution of products and services among the individuals that comprise it. A contemporary matter relative to the economic system as circularity is the feasibility of maintaining autopoiesis in face of the continuous growth of urban population, considering the depletion of the natural resources available.

The historically and culturally contextualized social relations and economic circuits interconnect and are in a state of flow and on-going change. In those fields, social agents move occupying and transforming the cities' material substrate. Hierarchically positioned, they compete for projects and, through political action, establish rules and provisions that may either maintain or change the urban systemic operation. Communication is a key component to legitimate the proposals and their representation is influenced by the symbolic structure of the systems of knowledge and understanding of the world. Politics and power relations are, thus, the 'line that sews' the further components of this complex system, the city.

The multiple urban identities and the cities' qualification movements

Currently, several movements made by the society encourage given operating arrangements in the cities and promote, through qualification or titles, acknowledgement of the ones that meet pre-established standards. This social phenomenon of qualification and acknowledgement of the cities starts with the mobilization of different players and organizations, whose purposes, motivations and power of action, vary according to their economic, social, cultural and symbolic capitals. As previously noted, we propose that

it is the continuous interaction of those same elements that characterize a city as being an autopoietic organism.

Examples of such movements are the enterprising, resilient, bicycle-, age-, child-, friendly- cities, among further denominations. If we observe the elements that favor such denominations we will find that it is possible to aggregate them into the physical, socioeconomic, cultural and symbolic categories, with varying intensity according to the aspect emphasized on each of those identification processes.

But what would define a sustainable or healthy city under the perspective of an autopoietic organism? As compared to other qualification processes, they seem to embed more complex recurrent relations among the four elements, which in turn leads to more systemic and broader interactions and to the inclusion of new operational processes resulting from those elements as well as from other ones. Their major determinant is that the environment and health, respectively, are constitutive elements of the urban frame.

Sustainable cities were structured on Ignacy Sachs (1995) concept ('development such that will not compromise the quality of life of the future generations'), consolidated in Brundtland's document, the UN Conferences on Environment and Development, and in the UN Human Settlements Program. Sustainable cities make proper use of the soil, produce healthy food, provide energy and water of quality, control waste, favor good urban mobility and morphology (UN-DESA, 2013). They entail 'the integration of four pillars: social development, economic development, environmental management, and urban governance'. A city cannot be deemed sustainable unless it is properly and accountably managed, with budgetary responsibility, monitored by indicators and open to community participation, with representation of all stakeholders in policy formulation and follow-up, including residents, public managers, business segment and the third sector.

The healthy cities movement, promoted by the World Health Organization (WHO), originated from a Canadian experience introduced in the late 80s. A healthy city is 'the one that is continuously creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential' (WHO, 1998) and their essential elements include political commitment, intersectoral collaboration; community participation, activities integration; sharing of information, monitoring, assessment and involvement of social communication means (OPAS, s/d). The movement originated within the concept and practices of health promotion and emerged as a field of public health, although today, according to Buss (2003) further social governmental sectors and nongovernmental organizations embrace and foster it.

Sustainable cities influence more as compared to the healthy cities proposal the political agenda setting. Sustainable cities rely on a clear economic framework, while healthy cities are focused on solidarity and progressive social relations. The idea of sustainable cities has reached a global dimension and developed into a series of new architectonic and urban technologies, connected with the segments that comprise the urban field - housing, mobility, infrastructure, including new communication technologies. The healthy cities movement, in turn, remained circumscribed to the public health field. In both one finds, under the common denomination, a variety of actions and proposals that range from the sheer provision of basic sanitation to the installment of smart cities.

Analysis of the proposal of healthy and sustainable cities as autopoietic organisms and relational fields implies assessment of a.) whether its constitution can result from the continuous relations among the four elements cited, and b.) the role that is performed by social agents considering their position in the fields of knowledge and power.

In the historical and cultural field, the idea of salubrity is linked to urban planning. However, despite the theoretical nexus, such link is still to be built in many modern cities worldwide. Urban theories and practices likewise embed neither the broad concept of health (a resource for everyday life, allowing people to lead an individually, socially, and economically productive life) nor that of health promotion ('the process of enabling people to increase control over, and to improve, their health') elaborated by the WHO (1998). Urbanism tends to consider urban health within the infrastructure aspect (sanitation) (Acserald, 1999), delegating the health of people and populations to other fields of knowledge

(Medicine, in particular). One of the major hindrances to the implementation of healthy cities, according to review papers, is the lack of integration between health and urban policies (Webster, 2009). Social relations are pivotal for the healthy city, and the economic circuit is the background for the 'maximum development of people'. Multilateral agencies, academic people and government agencies connected with health are the main players championing the proposal. We assume that such foundations and arrangement, while providing the proposal with social legitimacy, at the same time limit its spreading.

The environment has followed a different path of incorporation into urbanism and urban life. It moved from the merely scenic aspect to one of active agent in the construction of the urban environment, physical and subjective element, mandatory component for the quality of life and economic alternative for development that allows for the life of the future generations. Those precepts of both social and economic nature are specified in the movement guidelines. Sustainable cities are physical, social, and economic projects, championed by multilateral and bilateral agencies, as well as by the business sector. Their implementation generates several economic circuits, socially legitimatized as 'good practice'. They have a marked symbolic power, forming an urban identification that is well accepted and provider of privileged insertion into the worldwide circuit. At the same time, they share with the 'healthy cities' the polysemy that allows them to house actions of different reach and features. With such properties, the sustainable urban initiatives multiply, reinforcing city aspects that define a certain identity, and that are communicated in a reflexive fashion. To Acserald (1999), in a still pertinent analysis, social representation of sustainable cities can be seen as a search for metabolic balance, a model that privileges urban form and market regulation; for quality of life, with focus on citizenship and cultural and historical patrimony, or as a means to achieve efficiency and equity, in this case a political, socially built project.

Closing with questionings

The city is a complex system, self-referenced, at the same time open and closed to its surroundings, in constant movement and transformation, produced and reproduced by its elements' interaction. Communication is a paramount element if the city is to be maintained and reproduced. Within the fields that form the cities as contingent systems, move the men who, through agency, understood from the social-historical and relational perspective, build meanings that enable actions and form identities. Such identities are many times denominated, feeding back the processes that form the unique nature of every city.

Under the common denomination of 'healthy' or 'sustainable' cities a range of possibilities is unfolded, allowing for every choice to be given a sense of its own, which will reinforce the elements that make up the system: the 'healthy city' and 'sustainable city' ideal types carry variations and must be used in the plural form – healthy cities, or even in a more restrictive form: healthy or sustainable settings, within economically and socially unequal cities. This word plasticity allows for political building of different proposals, and the one of greater social legitimacy tends to be adopted. As Bourdieu points out, symbolic systems carry, in a concealed fashion, ideologies and present them as relations of meaning.

So, what would the senses behind the titles be? In postmodern, complex times, one cannot believe in universal proposals that intend to establish – within the physical, political, institutional, socioeconomic and symbolic fields – evolutionary stages of the cities. Who establishes the criteria and universal characteristics of the ways of urban well living – and for whom? Would such concepts be liable to be defined a priori for the entire society or would they be singularly perceived, as a result of the historical and cultural path of the social and economic relations established and of the symbolic structure associated with them? Understanding the city as an organism rather than as a body and as a dynamic, relational field implies diving deeper into such questions.

References

Acselrad, H. (1999). Discurso da Sustentabilidade Urbana. *Revista Brasileira de Estudos Urbanos E Regionais,* 1, 79–90.

Barth, F. (2005) Etnicidade e o Conceito de Cultura. *Antropolítica : Revista Contemporânea de Antropologia e Ciência Política,*19, 15-30.

Bourdieu, P. (1985). The Social Space and the Genesis of Groups. *Theory and Society,* 14 (6), 723–744.

Bourdieu, P. (1989). 'Espaço social e gênese das classes' in *O poder simbólico*, Bourdieu, P. (DIFEL Difusão Editorial LTDA, Lisboa) 133-161.

Buss, P. M. (2003). Uma introdução ao conceito de promoção da saúde. In Czeresnia, D & Freitas, C (Eds.), In *Promoção da saúde: conceitos, reflexões, tendências* (Editora Fiocruz, Rio de Janeiro) 15–38).

Freitag, B. (2012). *Teorias da Cidade* (Papirus Editora, Campinas)

Hall, S., (2005). *A identidade cultural na pós-modernidade* (DP&A Editora, Rio de Janeiro)

Lefebvre, H. (1991) *The production of space* (Editions Anthrops, Oxford)

Maturana, H.R. and Varela, F.G. (1995) A arvore do conhecimento. (Editora Psy, Campinas).

Maturana, H. (1997) *A Ontologia da Realidade.* (Editora UFMG, Belo Horizonte).

Nutbeam, D. (1986). Health promotion glossary. *Health Promotion International,* 1(1), 113–127. (http://doi.org/10.1093/heapro/1.1.113) accessed 01 jun 2015

OPAS, Organização Panamericana da Saúde. Divisão de Promoção e Proteção da Saúde. (2010) Municípios e comunidades saudáveis: guia dos prefeitos para promover qualidade de vida. (http://www.paho.org/Portuguese/AD/SDE/HS/MCS_Recomendacoes.pdf) accessed 05 Jan 2011

Outtes, J. and Miura, I.K. (2003). Disciplinar a la sociedad por medio de la ciudad: la génesis del urbanismo en Brasil y Argentina (1894-1945). *Secuencia Revista de historia y ciencias sociales*, 57, 125-56.

Park, R. E., Burgess, E. W., & McKenzie, R. D. (1925). The city. (The University of Chicago Press, Chicago) (http://www.esperdy.net/wp-content/uploads/2009/09/Park-The-City.pdf accessed 30 Nov 2014

Portugali, J. (1997). Self-organizing cities. *Futures*, 29(4), 353–380.

Sachs, I. (1995). Em busca de novas estratégias de desenvolvimento. *Estudos Avançados*, 9(25), 29–63.

Seidl, D. (2004). Luhmann's theory of autopoietic social systems. *Munich Business Research Paper*, 1–28. (http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.127.7674&rep=rep1&type=pdf) accessed 06 May 2015

Sennet, R. (1996) *Flesh and Stone The body and the System in Western Civilization.* (W.W. Norton & Company, New York)

UN-DESA (2013). Development Policy and Analysis Division: Towards Sustainable Cities, Chapter III of the 2013 World Economic and Social Survey, Sustainable Development Challenges (http://www.un.org/en/development/desa/policy/wess/wess_current/wess2013/Chapter3.pdf) accessed 06 May 2015

Vardy, S. (2009). Spatial agency: tactics of self-organisation. *Architectural Research Quarterly*, 13(02), 133-140.

Webster, P., & Lipp, A. (2009). The evolution of the WHO city health profiles: a content review. *Health Promotion International,* 24(1), i56–i63.

WHO, World Health Organization (1998). *Health promotion glossary. Health Promotion Internationa*l (Vol. 1). Geneva: WHO (http://www.who.int/healthy_settings/types/cities/en/) accessed 10 May 2015

Woodward, W. D. (2003). Technologized Communications as Artifact/Discourse/Relation: The Case of the Technological City. *Cultural Studies <—> Critical Methodologies,* 3(3), 330–354.

The language of the city, from tangible matter to iconic expression

Antonio Riondino
Corso di laurea in Architettura, Dipartimento dICAR Politecnico di Bari, Italy
Keywords: urban etymology, urban semantic, *forma urbis*

Abstract

The object of this thesis is to identify the relationships between the physical and the cognitive phenomena inside the processes of construction, adoption, interpretation and solution of the significance of the urban space.

Specifically, it means to investigate that transient domain, uncertain but however scientific -as verified by the studies on the perceptive and cognitive phenomena- aimed to consider the city as an áisthesis phenomenon and its Kantian interpretation of the sensible perception concept. A domain in which the urban matter, from being a real matter becomes a significant reference of the anthropic action, namely its ways and forms to organize and live the urban space. Released from the pure-visibilist meanings, the approach (applied to some sample Italian cities and to some didactic experiments carried out by the author) is based on the interpolation between two types of interpretation: the physic- documental / historical-processing interpretation concerning the reconstruction of the urban formation phases, the building types and the spatial configurations and the phenomenological interpretation, aimed to find the significance levels of the matter and spatial components, when these latter become urban defined figures, i.e. iconic expressions of the physical-social identity of the place.

Applying these considerations to the phenomena characterizing more and more the potential significances of the nowadays city, this analysis will try to propose a theoretic-methodological project aimed to give a contribution to the construction of a modern city, that will be again fit of Urbis form, i.e. able to give significance to its own settlement process.

"The real living rather involves an interpretation belonging,including the agreement as well as the possibility for a critical expression." (Gianni Vattimo, "Oltre l'interpretazione")

The search for a new etymology of the urban form during the Italian XX century

The goal of this dissertation is to investigate the relationships between the physical and cognitive phenomena in the construction and interpretation processes of the urban form, namely, of its *space significance*.

Specifically, it aims to explore the ephemeral field , "uncertain"- but not void of scientific value, as demonstrated by studies on the perceptual and cognitive processes – and tended to consider the city as a áisthesis phenomenon and its Kant derived interpretation of the "*sensible perception*" concept. Namely, the field in which the *urban matter*, from tangible matter, becomes the communicative phenomenon of the anthropic action, of its ways and forms employed and expressed through the organization and the living of the space.

Drained of the pure *visibiliste* meanings, this approach (returned in the next few pages through some sample experiments, carried out by the author in the educational sphere) is based on two types of readings: the matter-procedural reading concerning the urban structure, its building types and the consequent spatial configurations, and the phenomenological one, aimed at tracing the signification levels incurred by its own material components in their turning into urban figures in spatial expressions, iconic of physical and social identity.

Extending these considerations to the current concerns, the analysis aims to propose a theory-methodological project, aimed to give an important contribution to the construction of the current and future city. A city that should be able again of *forma urbis*, i.e. of a *language* able to communicative the cultural process inside in its own figure.

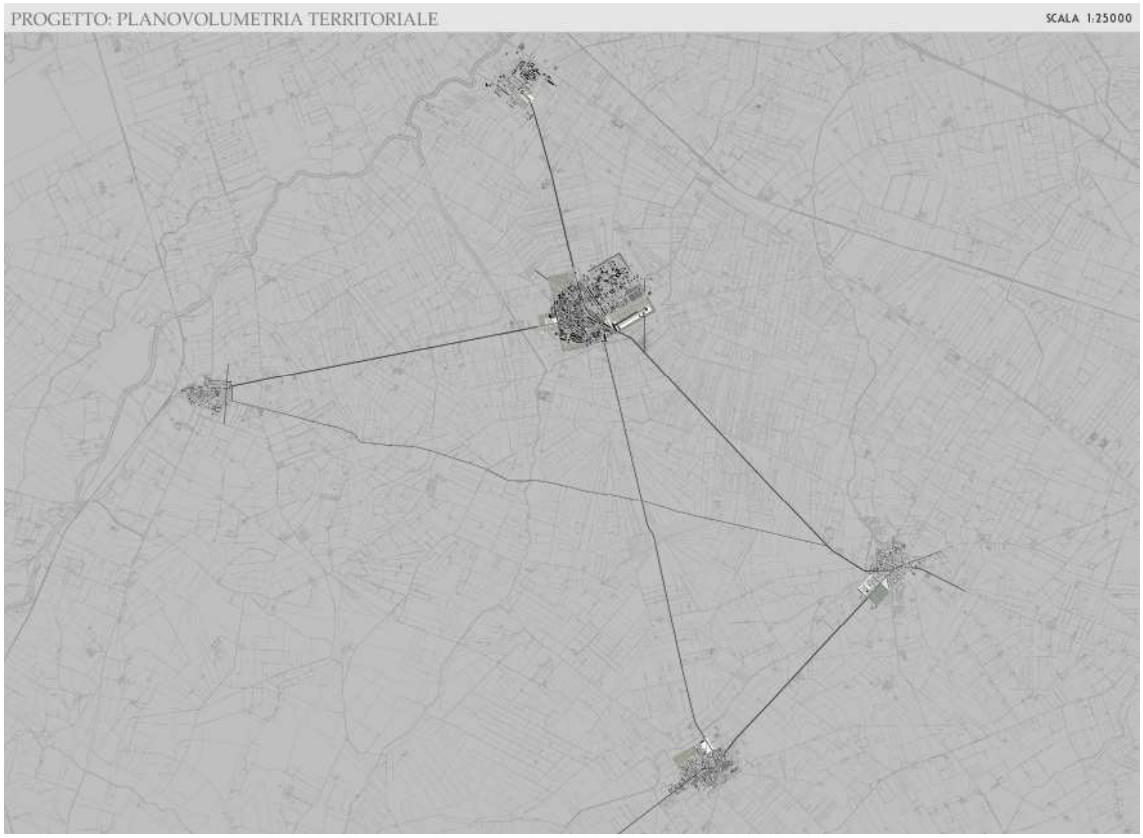


Figure 1. The planned cities of Daunia (Puglia, Italy): territorial map of Cinque Reali Siti (five Royal Sites) with the new villages for residential and public uses, linked to agricultural production

Using a reflection by Ludovico Quaroni, the goal of this analysis is to "[…] *take the thread again in hand, the action for the form of the city*".

This argument has its own reference not only in the spontaneous processes, but overall in the foundation City, i.e. the cultural and technical result of the birth of the City as the income of a critical self-consciousness.

From the city of Jericho, to those of Greek and Roman Foundation, to rural and medieval villages, to the Renaissance ideal towns and those of the enlightenment, to the town of the agrarian reform of Italy in 20s, and to the recent experiments carried out on the contemporary territory, the planned city has always had as its main aim the communication of its anthropology. In fact, its first identification effect is its figurative firmness. Through the disposition of the territory, the inside morphological order and their relation with its productive systems, it expresses its being *forma urbis*, giving a signification to its project: a collective work able to make communicative its own matter.

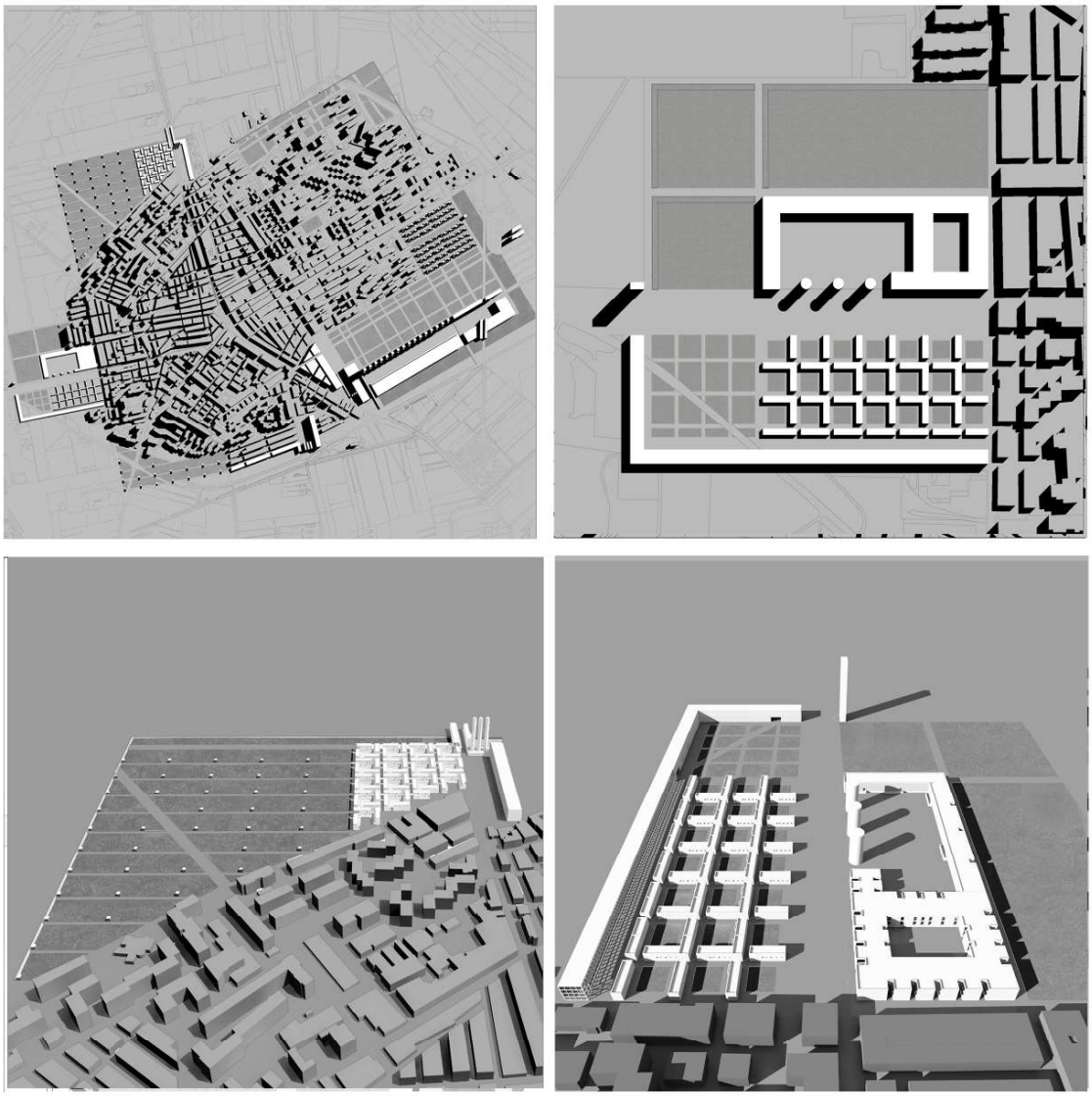
A civilization able to overthrow [...] the traditional accumulation of the spontaneous urban planning [...] is also able to retain the ability to project once the city is built. It is far-seeing because it can project its own future. It embanks the rivers, it constructs huge elevated platforms to keep dry the whole city, it regulates the white and black urban water, it produces, stores and distributes the food, it constructs admirable buildings for the common activity of its members, it has sufficient authority to handle everything and make it "last a long time". (Mortimer Wheeler)

This city is therefore the result of a project, of a social projection in time, which finds its anthropometric "contact" in the physic figurativeness, and its communicative expression in a kind of aesthetic code that can refer to an "*urban etymology*", derivable from the analysis of its cultural, social and technical processes. This is the city that speaks through a language derived from the history of the city, but declined in their specific dialectic similarities; a city that can solve the Babel lurking in the size of our contemporaneity. A city that is not in the multiplicity of its uncontrolled transformations, as well as in the assertive and axiomatic regulation of its rules, but, on the contrary, in the making of a training process conducted in the making to its genetic code, the type-morphology parameter, i.e. the basis of his own material-spatial configuration, namely of its own figurative synthesis. This synthesis finds its ultimate narrative expression in *forma Urbis* concept, the geometric aesthetic field, within which the matter, its own organization and control become tools for communication.

Intended in this way, the city becomes the identity of a style, an aesthetic phenomenon, through which logical interpretational procedures can be activated, passing through the concreteness of the matter. Working out Chomsky's thesis, this phenomenon is the result of a natural bent of the human being, namely the one that allows him to adapt and decline, from the inborn universe of our language and figure, his archetype components, enlarging, updating and modifying them in their own structure. It can do this without putting into crisis their genetic code, evolving it in organic elements, i.e. in reformed and syntactic organizations. This phenomenon concerns the entire urban history, the whole history of the anthropic phenomena. There has always been an architectural style or an urban structure that has had to deal with some changes in its construction processes. It is sufficient to think to those processes due to the entry of new materials, construction techniques, or to socio-economic and political-cultural changes . Processes that have ended up to put more and more in crisis the coherence permanence and transformation, namely the consolidated structure in relationship with the new components, finally: the language of the city in its synthesis of aesthetic values formed by the long sedimentation of its construction matters and social facts.

Resuming today those values, those notions, that *modus operandi*, means first to interpret the city primarily as *linguistic phenomenology*, i.e. as interpretative *modus* in which the objectivity of the matter takes on the pivotal role of document; a document able to teach its grammar, and with it come to its syntaxes. For example, starting from those relating to the organic relationships between building and urban form, between the city and

Figure 2. Project of new village for the city of Orta Nova

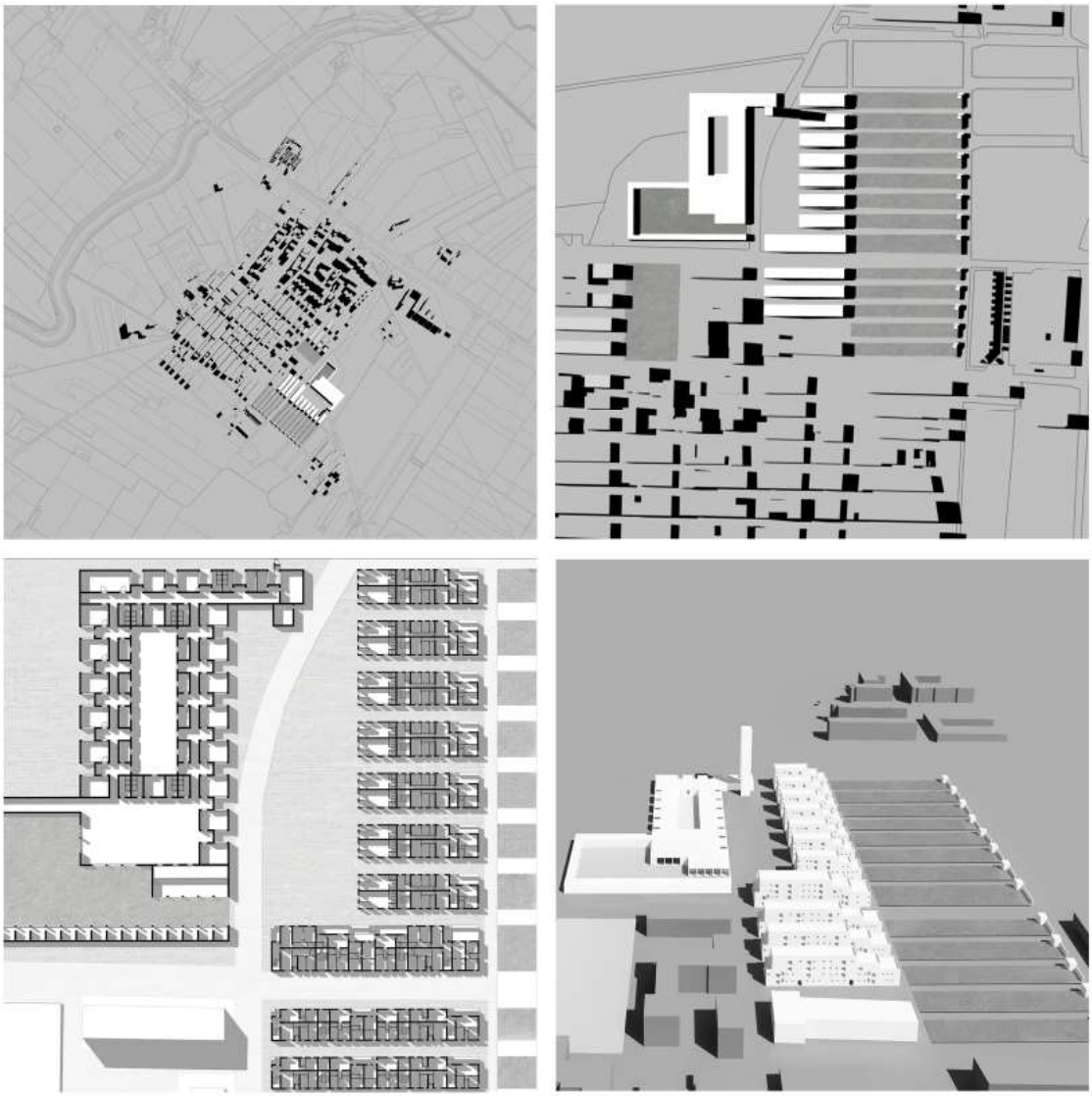


the territory, today more necessary than ever in the light of the phenomena produced by the "new dimension" and its "language" and that is, perhaps, the main problem of the language crisis, and thus of the identity that characterizes the current city.

Between the end of the 50s and the 60s, specific studies have been carried out in order to find, for the architecture, a new grammar apparatus, a linguistic code, able to transmit the current condition. Being inspired by the studies carried out in the fields of semantics, semiotics, language and music, these studies try to investigate some possible invariants, starting from the relationship between the historical code and the codes of the modern language. Forms and *modus operandi* in order to get parallel *interpretation modus* able of a scientific approach to the analysis and to the critical assessment of the phenomena, overall of those phenomena that are still incomprehensible, and of their net design. The architecture as a *language* having a sign system, a syntactic structure, in its organized on the basis of a semantic matrix, came from the assumption of De Saussure's and Hjelmslev's theories, and tended to investigate an autonomous, definable and transmissible structure.

In Italy especially, in the 50s, albeit in different forms, on the architectural plane, stud-

Figure 3. Project of new village for the city of Carapelle



ies by Saverio Muratori, Giuseppe Samonà, Ludovico Quaroni launched this trend, and then, between the years 60s and 70s, studies by Carlo Aymonino, Aldo Rossi and Franco Purini; finally, on the philosophical plane, those conducted by Umberto Eco, Klaus Koening, Italo Gamberini, De Fusco. Studies and theories that had as common matrix the interest for the study of the *phenomenal permanence* (whether it has a semantic or, as in the case of the architectural matter, a semiotic character). This matrix will find in the study of the type-morphological processes the way to recognize the terms, necessary to constitute a precise urban grammar. This is the case overall of Saverio Muratori who, on the basis of the theories derived from the School of the French and German geographers, will consider these processes as *invariants* of the organic process and of the subsequent urban transformation processes. Thus, a sort of lexicon of the city, able of a "method of analysis and of reconstruction of the formation processes", based on the relationship between *building types* and *urban morphologies*.

It is a theory-methodological framework that will have a different reading key in the theses expressed by Ludovico Quaroni, tended to consider the settlement processes and the subsequent *urban form* as the result of an unsure becoming. This latter is derived from

the physical-social transformations and is able to make impossible whatever a priori formulation, but it gives only the possibility to propose pseudo-linguistic parameters.

In Italy, this concept will give birth to a research that will find its theory-methodological field overall during the second half of the XX century thanks to the contribution of the "*structuralist*" research, carried out in order to find a "scientific" method able to decipher architectural procedures provided with definable structures and transmissible significances.

It is the case of Carlo Aymonino's theories concerning especially the type-morphology study and an idea of a "confrontational" city, i.e. considered only as a collection of parts among them in a weak relationship. This theory approaches that of Aldo Rossi, founded on the decisive role of the iconic elements considered as invariants of a possible "parallel" language, i.e. for similar shapes. Derived from the architecture of the ancient city, these forms are assumed as urban "grammar", starting a self-descriptive process based on "recurrent figures", referring to the collective memory.

In these years, Franco Purini will carry out the synthesis and the update of these theories. Working on the modern language, he will try to constitute new association structures, putting into relationship permanence and transformation, seen as the new possible urban-architectural syntax. A syntax that, as the gap characterizing the contemporary city, will prove to have partial and discontinuous forms. A kind of a wanted syntactic estrangement, based on position changes, "unfinished" buildings, including isolating elements, which create multiple reading plans. The City, considered now as a paratactic system, build *in fieri* to the contradictions of the political-social transformations, becomes the territory of a firm *re-signification* of its physical matter. Thus, there is the need to find new semiotics, *new forms of architectural writing* in order to interact with it. So that, possible sign "dictionaries", taxonomic classifications, taken from the different styles of the contemporary city, can become the construction plan of the new grammars, leading to a language characterized by that "*non-finite*" poetry theorized by E. Wòlfflin as the *aesthetic value* of our Time. A *Value* that will find a coherent application in the *critic Regionalism* theorized by Kenneth Frampton and Vittorio Gregotti during the 80s, as the condition for "*an architecture for the defense and the re-arrangement of the present*".

Between permanence and transformation, a search for invariants of the urban form

This re-arrangement refers to the material "*framework*" of which the contemporary city is constituted, and on which it is necessary to shed light, starting from a veritable *semantic reduction*.

In the *post-modern* and *neo-Rationalist* answer, this reduction will refer to the slogan: *the Presence of the past*, a slogan that will be mostly experimented in the *planned Architecture*. Developed mainly in Italy during 70s and 80s, it – the planned Architecture – will become the favorite place to experiment urban syntaxes based mainly on "layers" of materials taken from the ancient and recent history. Archeological documents and new figures of the technological uncertainty, poised between *conservation and transformation*, will be combined in plans that will make the *contradiction* the answer and, at the same time, the signification of the future city. A City tended to have as its reflection, as its grammar resource, as its possible *Urbis forms*, the characteristic pointed out by Franco Purini, i.e. "*the partial and discontinuous, casual and residual, boundless and tense universe, namely the current metropolis*".

Nowadays, this characteristic is assumed as a language whose syntactic invariants constitute an inexhaustible source of testing for some part of the architectural cultural, which this dissertation refers to.

The first syntactic invariant is the topographic entity, i.e. the orographic system seen on the basis of the natural landscape, the cultivable and settlement phenomena.

The second is the *layout*, interpreted, according Muratori, as the beginning of every settlement phenomena. Beginning and future of the urban processes, it – the *layout* – represents, at the same time, the unchangeable element and that of the main building transformation. Thus, the *layout*, as anthropological foundation, is the critic assumption for every form of transformation that can be considered coherent with its formation processes.

The third invariant is the type-morphological element, that establishes the distributive-architectural characteristics and their aggregation forms at urban scale, i.e. the "building texture". From the *court* to the *terraced types* and to the *pseudo-terraced* and in *line types*, their structure constitutes a syntactic phenomenon when they can create "*neighborhood relationships*" or critical distances, established on the basis of a logical *dispositio*.

The fourth invariant is the specialized building, as the *figurative constant* of the *collective memory*.

The fifth invariant is the "sense" of the "construction", intended as Vitruvius's *concinitas*, i.e. as the expression of its tectonic maximum.

The last invariant is represented by the iconic signs at large scale, necessary to put in "*communication the different phenomena acting in the territory*". These are the productive, civil and religious architectures that find the possibility to put in communication the territory with the urban building texture in the *sign proceeding* theorized by Wolfflin with the studies about the *Form psychology*, by Rudoolf Arnheim with the *Dynamics of the perceptive forms*, by Erwin Panofskj and Merleau Souty with the studies on the "cognitive/figurative methods".

A reading experiment and a project of the urban form, intended as iconic expression.

"Towards a new consistent measure"

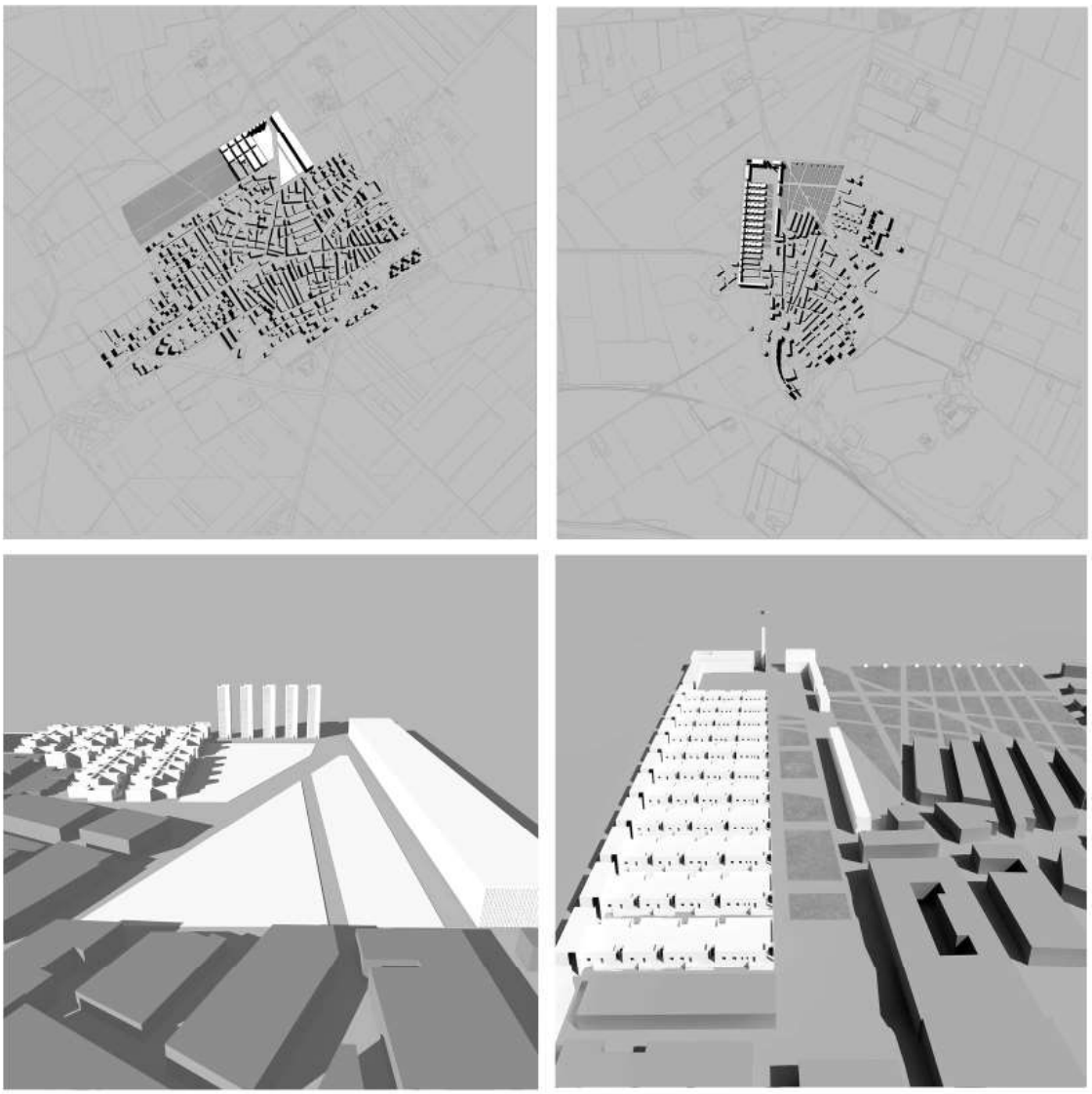
Projecting those theories in our research, the goal is to reflect on the possibility to offer theory-methodological project different from the "common city" as well as from the dynamics of the exclusion of its borders. It is a city project based on a "new *consistent* measure", having a recognizable *figurativeness* and able to find a remedy for the spreading of the edges, namely it should be able to resist the landscape conurbation, in order to establish a new urban "*etymology*". A city project restricted to the urban parts, having its theory-methodological reference overall in the "technic notion" proposed by Ludovico Quaroni and Carlo Aymonino, concerning the concept of *district or suburb* (concept that has to be redefined today regarding the globalization). A city able to activate that *hermeneutic circle* defined by Hans Georg Gadamer in *Truth and method*, in order to analyze and understand why the contemporary city cannot establish its design, its *form*, according logical systems and significances.

The interest places and the settlement invariants

These are the cities and territories of our didactic experiments, the one that are more subject phenomena: i.e. areas with a great production ability in which forms of "spread" pseudo-urbanization have developed and that have not a principle of settlement. These areas are in relationship with the established city (interventions of *urban formation*) as well as with its extra-moenia (interventions of *new foundation*). In the first case, the interventions result in foundation suburbs; in the second, they result in urban areas aimed to link the different peripheral areas. In both cases, the elements that organize the projects are those characterizing the ideal Urbis form, i.e.: the coherence and the firmness of the living texture, the strong figurativeness of its specialized buildings, of thei8r relation spaces, of the scale signs of the territory. Signs/invariants tended to become *system metaphysics, prescriptive* structure of the urban figure and of its architectures.

Proceeding by scale, these *invariants* first correspond to the orographic system, to its layouts, its building as well as natural architectural permanence. This permanence finds in the "urban boundaries" its main *expressive* phenomenon, tended to affect the other two *invariants*: the large-scale elements and the living texture. In our theory-project goals, these invariants will represent the signs/significances of the system. Applied to the territory of the Real Bourbon Sites at the center of the Daunia Apulia, the first invariant refers to the ground tracts designed by the cultivable grids, by the farm layouts, by the canalization for the water irrigation, by the grain silos. These elements can be recognized in the geometric regularity of the new suburbs, considered as "morphological multiples" of the territorial phenomenon. In these elements, the building types correspond to the reference area characteristics. Critically updated, they correspond to the *terraced* and

Figure 4. Project of new village for the city of Stornarella



pseudo-terraced types, both reorganized on the basis of the fundamental contribution given by the Modern to the living question. Their aggregation corresponds to that of the so-called "*neighborhood scale*" that, organized in relationship to the different morphological situations, produces different "type-morphological *forms*", so that it organizes the whole urban form as a set of *figurative derivatives.*

A possible iconic model of new-foundation city-territory

The result is the project of a "urban landscape" composed by "centered" elements, i.e. by *figurative-perceptive permanencies* in a strong physical and perceptive relationship with a landscape center (place of the common activities), so that it can be considered a veritable multi-center urban/territory district. It is a *settlement formulation*, at the same time *technical and iconic*, aimed to reach a self-discipline and a self-awareness. A formulation that is in some way similar to the ancient Hippodamus's ambition, to the ancient centurial *Castrum*, to the rural suburbs that from the Middle Age come to Saverio Muratori's Corteghiana, to the Aldo Rossi's analogic collages, to the Franco Purini's Vema. A city where the "*form of the territory*" suggested by Vittorio Gregotti can be-

come a real hypothesis for new urban-landscape significances. A city (reminding Gadamer) able to develop new roles and significances, to reveal the most implicit "*properties*", so that they become "*connecting forms*" narrative of its urban anthropology, trying to solve the alienation the man of the contemporary city was obliged to.

References

Gregotti, V. (2012) *Incertezze e simulazioni. Architettura tra moderno e contemporaneo* (Milano, Skira).
Purini, F. (2008) *La città come testo critico* (Milano, Angeli Editore).
Terranova, A. (2001) *Mostrimetropolitani* (Roma, Melteni Editore).
Jenks, C., Baird, G. (1974) *Il significato in architettura* (Dedalo edizioni, Milano).
Koenig, G. K., (1970) *Architettura e comunicazione* (L.E.F. edizioni, Firenze).
Arnheim, R. (1977) *Arte e percezione visiva* (Feltrinelli, Milano).
De Fusco, R. (1967) *Architettura come mass medium* (Dedalo edizioni, Bari).
Eco, U. (1967) *Appunti per una semiologia delle comunicazioni visive* (Bompiani, Milano).
Wolfflin, H. (2010) *Psicologia dell'architettura* (et. al. Ed, Venezia).
Vattimo, G. (1994) *Oltre l'interpretazione* (Laterza editore, Bari).

Buildings as beasts, cities as jungles. An issue between poetics and politics

Luca De Vitis
Draco PhD School, "Sapienza" University of Rome, via Gramsci 53A, 00197, Rome, Italy
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Abstract

The contribution begins by noting that the model of the network and the incessant channeling information flows are fueling the current condition of the city, being wanted as smart, resilient, metabolic. The biological analogy of the "living organism" provides that urban life is governed by the forces of self-balance and self-organization, both in a physical and social way, and is nourished by the digital universe, which favors the parameterization of life in computable data through the self-generation of the form. Metamorphism of architectural design, characterized by exasperation and structural functionalist-oriented response to the problems of the city, clashes with the construction procedures that, rejecting the technicist communication, include in the single object an idea of the city. The search for tools and languages can reduce the separation between poetics and politics, going into actions of reduction, anonymity and the intelligibility of the form as the exaltation of the values of the construction: a construction that does not renounce to the generation of a sense in urban life through the definition of places. This paper addresses this problem by focusing on the analysis of constructive procedures as happening in the project, through the critical reconstruction of reasons and tools, and focusing particularly on high buildings as the contradictory emblem of urban values of modernity.

Introduction. The *biological paradigm* as a waiver of the city

The project for the city, in its setting improvements for living, inevitably collides with the modification of the environment for which it is processed, showing the new through disconnections and reformulations of permanent themes that substantiate the continuity in time of the collective value of city. The city, as a collective construction, goes today through a condition of separation, first from the morphological point of view, so the issues related to the definition of its form, concerning the center-periphery and urban-rural relations, persist, from the era of the nineteenth-century industrial cities, in asking to architecture and planning responses in terms of organization. Morphology, as a representation of the actions of organization of urban matter in a recognizable unit, develops the idea of the city in the form of work accomplished by configuring each time the relationships and roles between the parts, in a metamorphic system substantiated by inheritance and foundational reasons. Reasons that, in the draft of a new definition of the form, find in the prior matter the primary material for the construction.

The condition of separation, tackled by the search for unity in the project, is mainly due to two aspects, to be found respectively in the political condition of representation and in the procedures for the construction of architectural and urban form. The first theme concerns the multiplicity of individualized forces that contribute to urban construction, with interests and methods of intervention in the territory diversified and contradicting each other. By one side we have the atopic forces of finance and business, contributing to the deterritorialization of transnational interests (Sassen 2005) with the inclusion of the city and the architecture in the global network, so spectacular and communicative buildings are erected, in order to attract economic interests; on the other side we have the contrast generated by the partiality of these singular interventions, against a vast urban territory lacking of structural definition. In this contrast takes place a status of decline, in which the citizen organizations, under the banner of the *Do It Yourself*, arrogate to themselves the task of reacting, in the name of decency, to hide the lack of actions towards the urban substance (Pitch 2013). The names whereby the mainstream culture defines the city resilient, smart, metabolic, fuel the vision of the city as a "sick" organism, threatened by dangers, and propose care through the joint of digital technology, environmental sustainability and the regeneration of the city as an environment, in which the artificial and the natural should be able to enter into a new agreement for the safety of urban life (Purini 2014). The conjunction between the environmentalist ideology and technology offers a vision of urban welfare, where the construction takes a negative role, in favor of recycling operations and coercive conservation, in the name of an ideal fusion between city and nature blurring roles in a utopian complementary identity, the unresolved issues emerged with urban theories of early modernity are reported again in current time. The brake to rethink the actual value of urban objects, elements of a formless and unlimited system, waiting for a definition that represents the need, prevents fundamental positions against that new definition.

The second issue has to do with the planning processes that deal with the inability to see the city as a unitary fact but as a nodal made crossings (Ungers 1997): urban sections created to juxtaposition that identify islands tend to autonomy, which depends on the correlation structure of the network of connections. The individual intervention on the urban area comes into conflict with the proliferation of repetitive suburbs, connoted by low hierarchy and the lack of a structure able to establish his identity and relationships. With reference to the post-war urban expansion, up to the spread of sprawl in the larger urban centers of the world, these urban masses are currently entered in the urban and pop culture imaginary as permanent features, finally reversing the polarity between monumental construction and civilized city, that Aldo Rossi described as the essence of the city (*The architecture of the city 1966*) in its expression of collective values and the permanence of dwelling, into urban unity. This oppositional turnaround, exasperated by the communication languages of the "new monuments", requires that the infrastructural network is not enough to be thought as a solution, for the assembly of autonomous urban units: it is rather necessary to define design instruments capable of building the spatial identity of the urban matter, within a vision

that establishes the roles and the level of autonomy. Actions of re-foundation must include the sense of the separation for the specific parts.

In the statement of Chinese President Xi Jinping, who is appealing to architects and governance so that they choose not to carry more "weird buildings" out (Arlt 2014), lies the full force of the contradictions that run through the country's development, in the unstable equilibrium between the need of representation of the power and the problems of the growing housing needs, which must be replied to with the building of huge production of urban sites, that are already inhabited. In this intermediate vacuum, represented by the distance between architectural decisions staying at odds — the hypersofisticated architectural form and hyper-generic urban form — fitting the need of a new measurement of the territory, in order to recover the unity between architecture and city through models that do not pose only a technicality response to the problems of the city, but, rather, will investigate its identity, which is primarily morphological.

For these reasons the hypothesis of resilience and of the city as a naturalized organism represent precarious metaphors, leading the higher purpose of building to a truce: the current formless condition suspends the definition of the form that is inherent in every (art) work (Krauss, Bois 2008), and therefore also in the city, corresponds the suspension of the search for instruments to concretely transform a state pending to progress.

Methodology

The contribution builds a relationship between the constructive processes of architectural form, and the current issues related to the political sense of the construction of the city, meant as a representation of the collectivity. The goal is to correlate the representation of social and physical diversity of the city, especially the metropolis, with the scope of the morphological fragmentation of parts of which the contemporary city is made of, with the aim to identify the current issues of the definition of the structural relationships of complex organisms.

First is defined, from a theoretical point of view, the framework for constructing an analogy between urban phenomena and the aesthetics of the formless, as the operating mode that suspends the actions of deep structural modification. In this regard, it is highlighted the functionalist matrix of many current methods, which involve a vision of urban phenomena from an analytical point of view and producing isolated interventions, increasing the relational separation between the parts and the whole.

Based on the previous considerations, the contribution focuses on the conflict between continuity and discontinuity in the architectural project, which corresponds to the construction of dialogue on urban parts according to morphological unity: in this stage is highlighted the need to reduce as a instrument in the foundational determination of structural relationships, through the collective sense of the management of large scale.

The essay finally focuses on the relationship between the case study of Rome, dominated by a horizontal and growing dimension, the events of the building of his administrative apparatus, and the high building type, regarded as significant in the relationship between urban form and land occupation; this, in order to illustrate the evolution of the strategies feeding the architectural and structural organization of the urban whole.

Morphogenesis and reduction

The aesthetic condition of "formlessness", physical and political, has similarities with the imagery of the city conceived as a phenomenon similar to the network of the bits — theorized by William J. Mitchell (*City of bits* 1995) — and as the cluster of the incessant flow of informations. The idea of dynamic process involves both the single artifact and the city, a habitat in which the changes of the built space occur with great speed, and with the complexity generated by the simultaneous presence of individuals and social groups who for various reasons live in the jungle of concentration. Functional determinism, mathematics and mechanics would provide the key to access the infinite becoming of organic forms, with a view that sees the mechanism of nature as a self-balanced

processing of life, able to select the best options for formal organization and species. This implies that the shape is the result of multiple physical forces, proper of their environment, to which it is subject and which is designed as a transient event in its determination: not a stable configuration, but rather a dynamic object and in motion within an environmental process. With this vision of architectural construction have to some researches such as Karl S. Chu's *Genetic Space*, Marcos Novak's *Transarchitecture*, Kas Oosterhuis' *Hyperbodies*, Bernard Hillier's *Space Syntax*: the use of space and the behaviorial analysis of individuals in it, provide the informations to the digital universe, which algorithms can thereby process in forms that are functionally efficient, where the architect is responsible for orienting the foreshadowing.

In this technological scenario of metaphorical conjugation of artifice and nature, the architect, as administrator of the *autopoiesis* process, is suspended from performing the ethic and aesthetic choices that determine the construction, in the sense of representation as a form of knowledge, and not imitation/computation. The use of metaphor and analogy, in the composition, shows how the manifestation of the new depends on the conveyance of the images for the transmission of its meaning. The use of the machine metaphor by Le Corbusier, and the image of Aalto's Finnish coast, show the transition from the pragmatic mode to the creative one, a process based on synthesis rather than analysis (Ungers 2012), to transmit new meanings that the project rests in the disposition of the matter. The research that is done in the invention, therefore, can not rely solely on the quantification of data, but on building reasons for which the image is quite the surficial vehicle, which requires, in the project, a translation under specific terms of architecture: measurement, structure, hierarchy.

The invention, more over, defining the representation as a pre-figurative vision of a new reality (Argan, 1965), and not a reproduction of the already present, manifests itself in the project through the natural contrast between individual and collective, that pours in building-city relationship and, in the vastness of the metropolis, in the relationship between division and unity of the parts: the synthesis developed by the project, in tracing new thresholds of this advanced but partial unity, it is thereby an opposition. The action of reducing the contingent reality to its formal so essential qualities, formed by the traces of the past on which the foundational choices that select these tracks are set, opposes the performative and generic vision of the contemporary city, redefining the role of memory and setting a different origin for the beginning of a new identity of the parts.

Designing discontinuities

In this perspective, the demolitions during the late nineteenth century that occur in many European cities — the haussmannian Paris, Vienna's Ring, the new axes of capital Rome — require for the urban form the consciousness of their condition, which continues in the contemporary, and mark the distance with modeling urban form as a complete system.

The experiences of Le Corbusier (*Plan Voisin, Plan Obus*), Frank Lloyd Wright (*Broadacre City*) and Ludwig Hilberseimer (*Großstadt*) define the origin from the urgent issue of the big city and its size in relation to an unprecedented level of housing concentration, stating the innovative nature in operations of foundation which are confronted with the structural and typological needs. The search for order conflicts with the historicity, and states with actions of radical cancellation of the material memory of the previous city, in the case of Le Corbusier, proceeding for selection of axes and nuclei to be included in the new design. The need for a new structure is in the action of exclusion, which continues through the identification of what is stated as superfluous, selecting the items of relationship with physical reality, that in the building of the form makes reference to a precise idea of the city, whose construction is first thematic, then political.

The hypertrophic and growing expansion of today's urban centers (UN Editorial 2014) shows a strong analogy with last century's issues for the detection of operational instruments that can deal with the evolution of the same problem, which is potentially infinite and therefore requires long term visions in generating a structure, which can be able to overcome the conflict between the urban design and the single intervention. The un-

predictable nature of the metropolis then pours in the opposition between the political management of the design and the strategies of architecture, in which the multifaceted and discontinuous substance of the city can take a positive project value, addressing the most authentic representation of the gathering diversity, which belongs to the urban phenomenon. The aesthetic ways in search of new identities, transitional and hybrid, such as those proposed by Gilles Clemènt's *third landscape* and Matteo Casagrande's *third city*, offer alternatives to radical thought, and propose to explore its fragmentary condition, as alternative to the search for unity, establishing dialogic methods between artifice and nature starting from the object scale. But this hybridization is related both to the level of form and the representation of the marginality of ideologically oriented building as a current circumstance, so it is bound to produce operational instruments of repair, injection, re-design, while the city waits for a structure.

The construction of the collective vision within the project is therefore dependent on the circumstances of reality, for which it is also necessary to reduce the formal qualities, in order to propose to overcome them and select the hereditary characteristics for the next configuration. In this regard Oswald Mathias Ungers identifies two instrumental modes of operating in the separation (*The dialectic city,* 1997), which link the project to the reading of the city as a result of layers and discontinuity of matter and voids, so the inability to devise the city as a united fact is replaced by the city of complementary places, in so far "is developed an urban aspect particularly taking into account the whole", so using the concept of area as an element of exploration and decision, starting from the morphological identity of precise sites, strengthened in the project through the structural modification of the layers.

The reduction as a strategy aims to define urban organization through a gathering view and undermining the need of the parties themselves: the search for synthesis as setting development, and not as a goal, then it looks as radical action, in which the building meets his negative actions of cancellation. [Figure 1] "Every generation must build its own city", wrote Antonio Sant'Elia[1], alluding with emphasis to the freedom that the constructive act can represent determining the collective advance against the past.

Vertical oppositions to the horizontal morphology of Rome

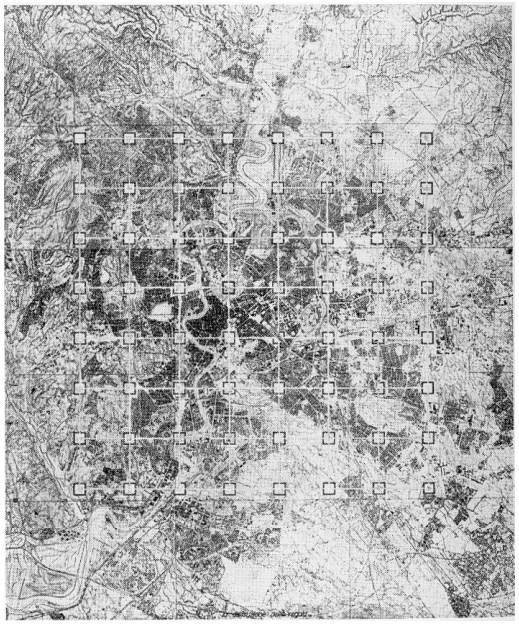
Through the simultaneous presence of several economic and decisional forces, and with the impressive growth of the major urban centers after World War II, the issue of form and structure of the city is the central question and, in many cases, yet to be defined until now. The installation of business districts as hybrid bodies, indicators of the city as the hub of communications of the neural network on the territory, is followed by the parallel development of the illegal and self-built city, showing the lack of unity in the political management of the transformation of the great metropolitan areas. The dream of a clear and innovative modernity, conceived by Le Corbusier and Hilberseimer, breaks on the crystal skylines that embody the representation of the atopic financial power, protagonist of urban construction and territorial interests.

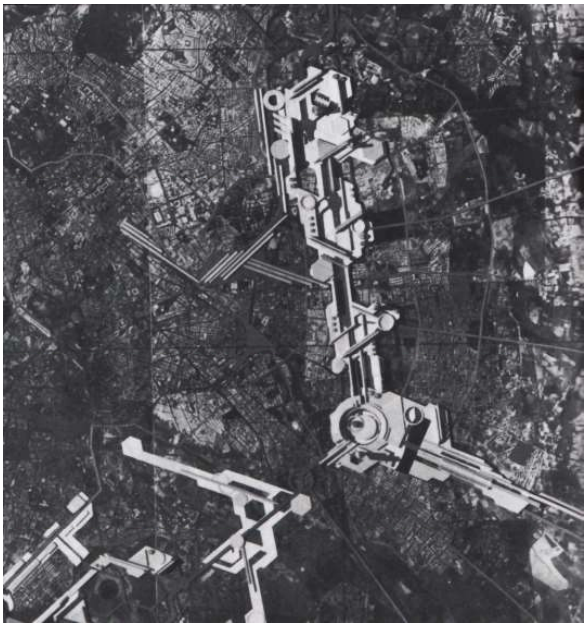
In this scenario, the tower/high-rise type, constructive and typological emblem of modernity, remains suspended between its full expressive potential of the principle of concentration, as a strategic instrument managing the mass housing, and its symbolic role in the organization and signage of the wide horizontal extension. This is as a matter of fact testified by the hyper-concentration scenarios of the residential Hong Kong, which currently reproduce the problems of urban zoning for separate functions, and, conversely, by the Manhattan's typological explosion, where, to the morphological neutralization of the urban settlement responds the internal complexity of the building, in a set of plural individualities that soon runs out the "delirious push of the collective urban experiment" (Koolhaas 2003).

The examples provided by the *tabula rasa architecture* highlight the details of the problematic relationship between urban morphology and architectural typology, which

[1]Manifesto dell'Architettura Futurista, Milano, 11 luglio 1914.

Figure 1. Franco Purini, La distruzione della regola, from the series 'Progetti di distruzione', 1991
Figure 2. Studio Asse, *Plan of the Asse Attrezzato*, 1967





otherwise occur in the representation of the conflict between the traces of memory and the necessity of the new structuring. In this regard, the recent urban history of Rome shows that the lost opportunity, with the failure to build its alternative administrative core, leads to the accumulation of enormous operational gaps in the subsequent fifty years.

From WWII to the Sixties, in fact, the city grows through an enormous expansion phase characterized by the occupation of the peripheral voids outside the historic center, in a total absence of design and with the mechanisms of private speculation, that leave the architects in a marginal position. This condition coincides with the figure of a formless archipelago, and is still highly dependent on the centric road network, at the center of which are located all the administrative functions of the city. The need for design and controlled planning, ie an action that exerts control through the introduction of hierarchy in the mass, it is increasingly urgent and in this direction arises the Master Plan of 1962, which contains a proposal to create an "equipped axis" (Asse attrezzato) eastward, from the north-eastern Montesacro towards the southern EUR neighborhood: a backbone incorporating the previous idea of Luigi Piccinato, 1955, to put a structure in four sites spread in the eastern side — Pietralata, Prenestina, Centocelle, Tormarancia — the directional functions of the city. [Figure 2]

In 1967 *Studio Asse* is instituted[2] with the intent to take effective the proposals of the Plan relating to the new administrative structure, followed by a program of cultural diffusion. The idea of the Axis is concise and simple, in its intentions: unity between architecture and urban planning, control of change through urban design, research of urban identity in its new planimetric image. The system connects to the roads of entrance to the city and redraws the skyline of Rome through the presence of towers. Of that project only a few fragments, illogically spread in the territory, survive; the approval process is lengthy and uncoordinated, and undergoes several stages of downsizing in the years, including the architectural proposal for Eastern Rome in 1973[3]: seventeen

[2]The firm Studio Asse is composed by Vinicio Delleani, Mario Fiorentino, Riccardo Morandi, Vincenzo, Fausto and Lucio Passarelli, Ludovico Quaroni, plus Bruno Zevi.

[3]This proposistion was presented at the XVII Triennale di Milano by Carlo Aymonino, Costantino Dardi and Raffaele Panella.

intermediate poles, with administrative and cultural functions, are placed along the roads Tiburtina, Tuscolana and Casilina, crossing the park Parco dell'Appia, in order to set up a city within the city to guide the development of new neighborhoods. In 1979, between the slow processes of acquiring the operational instruments and long feasibility studies, the design of the Axis is further reduced in the SDO, *Sistema Direzionale Orientale* (Eastern Administrative System), and finally pulverized in the nuclei of Pietralata, Torre Spaccata, and also the already configured *city* of EUR, scene of some experiments between large size and verticality.

Meanwhile, the morphological condition of the Rome remains unchanged and rather more critical. The political lack of collective visions and the soil emploitation reach a new degree of separation, ideological and physical, with the building of the big neighborhoods of affordable and popular housing (*Piani di edilizia economica e popolare*: PEEP) in the Seventies: residential units, designed with the principle of the self-sufficient subsystem, scattered in places considered strategic to give structure to the incessant proliferation of spontaneous settlements. The vast settlements, with intensive types such as tower and multi-storey buildings, suffer for the lack of services and the lack of connections with the structured urban center, proposing in many cases the logic of the big-sized in a void. Although animated by the spirit of organizing in a hierarchy the voids and the minor settlements, these interventions help to increase the deficit of services: the political attention to the illegal settlements and the recovery of this deficit is, over time, the brake to the possible overview of the city as a greater whole.

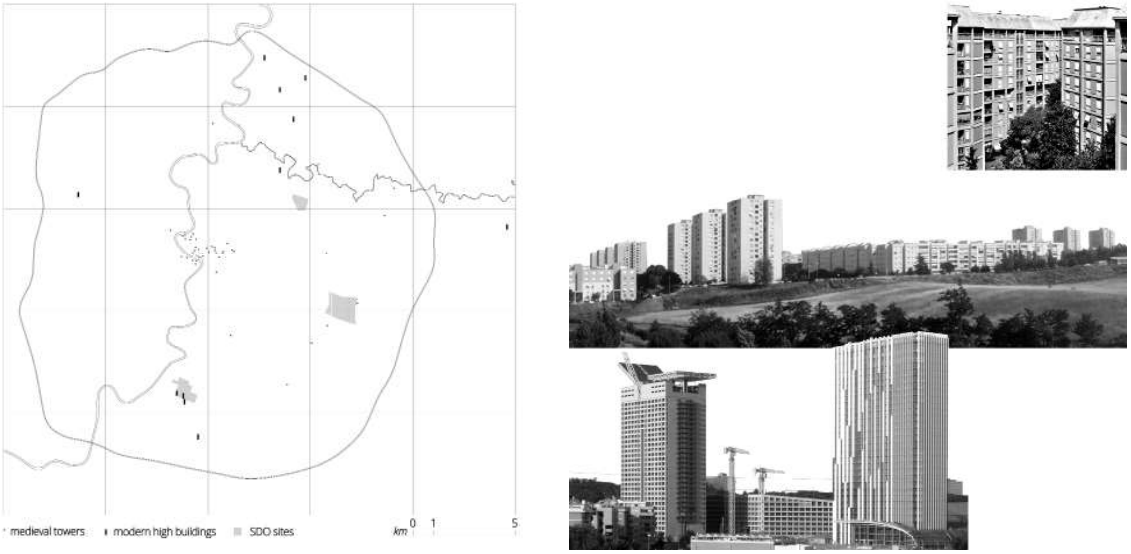
The completion of the highway ring around the city (*Grande raccordo anulare:* GRA), meanwhile, moves the ideal limit of the city in depth, into the country, and is in turn transformed into an urban axis through the development of industrial buildings and illegal settlements. The failure in the metamorphosis of the urban structure is confirmed by the proposed design for the modification of Rome in 1985 , in which the features of the Axis are transferred on the highway ring, turning it into a proper facility, referring to the now inevitable urban hyper-scale. The centric scheme of Rome persists as the dominant morphology, and the events that follow until the Nineties attempt to retrieve the defeat of the Axis idea through Kenzo Tange's plan (1987-1992), which is lacking operational procedures of implementation, up to the 2002 proposal to transform the SDO in a plural system of Urban Centralities: an extended nervous system locating large trade, cultural and tertiary sector, intended to receive and retransmit the great currents of informations that cross the metropolis.

The Axis project is transformed into the system of Centralities, moving from the deep idea of the re-foundation to the juxtaposition of fragments, highlighting how the transition from strategy to structure, in fact, is never fulfilled: the long period of time leading to the non-implementation of the plans produces in the city the eternal return of an obsolete scheme, increasing indefinitely the gap between the imagined city and the real one, which grows in the static relationship between an unequivocal center and a periphery that can not be seen as a system of elements taking part into a unified vision, albeit extended and fragmented.

The paralysis of Roman structural morphology suffers from wider issues, including the opposition to concentration as a permanent problem in Italian — see the cases of Corviale in Rome, Zen in Palermo, Scampia in Naples — and reflects the separation between the instruments of policy planning, both in terms of governance and construction of collective identity, through the conveyance of the urban image as a synthesis of progress towards the new choices. The radical nature of the choices that are deemed as necessary, must match the construction of the idea in its general and then specific sense, through the use of instruments furthering the relationship between architecture and its territory.

The case of Rome draws attention to the denial of typological research as a medium for the construction of identity between housing and the city, that is in its *forma urbis* more than ever suspended. Domain of the immeasurable and permanent horizontal dimension follows a problematic relationship with the radical nature of the concentration, expressed, for example, by the rarity of vertical buildings. [Figure 3] The typological experimentations of Mario Ridolfi, in the group of tower houses built under INA agency, work

Figure 3. *Plan of Rome mapping towers, high-rise buildings and SDO sites.* Graphic processing by the author
Figure 4. *Modern towers in Rome: Mario Ridolfi et al. – viale Etiopia (1950-54), Pietro Barucci et al. – Tor Bella Monaca (1980-83), Franco Purini and Laura Thermes – Eurosky (2010-12).* Graphic processing by the author



linguistically on the theme of cultural continuity, which is used in a structural way with a
1280 design still tied to the theme of the *palazzina*, considered as the dominant type in the city; in the high-density interventions in popular neighborhoods such as Torrevecchia and Fidene, the vertical elements are used to stratify the variety in urban residential areas, compared with the location in the territory by the introduction of aircraft relationships measuring the city, visually identifiable from the GRA ring road, definitely entered as active part of the wide urban environment of Rome.

Visual measurement is an attempt to report the limit virtually, through the emission of architectural signals alternative to the scale of the dwelling, through of a weak strategy that refers to visuality as symbolic translation of the measurement itself. Again, this positive strategy is undermined by recent events, in a climate of uncertainty, defined by building and cancellation as irreconcilable actions in the project. In this regard, specimens are the recent construction of the Eurosky Tower in the EUR neighborhood, designed by Franco Purini and Laura Thermes, and the proposal for the demolition of the towers of the Tor Bella Monaca site in the Eastern suburban side. [Figure 4] On one hand, we have a building that combines the typological experimentation of dwelling modular units with energy issues and functional diversity, fitting into the city through the planimetric drawing of an entire sector of services, with a ground level rich in spatial alternatives. The project proposes an idea of vertical city that is rooted to the ground in continuity with the existing settlement; the distribution of functions between vertical and horizontal is complemented, in terms of form, in favor of the establishment of access to the city from the South, with the doubling of the tower to set up a visual portal. On the other hand, the proposed operations for Tor Bella Monaca in 2010 report the morphological issues to the realistic plan of the environmental circumstances, in a scenario of coincidence of form and behavior, with the type imputed to be the engine of social degradation. The plan promoted by the city government, based on a master plan designed by Leon Krier, provides the towers to be replaced with more traditional multi-storey buildings, modeling the system on the *new town* approach, and confirming the dominant and repetitive horizontal dimension.

Conclusions

The consequences of a culturally uncertain construction lead to a state of immobility, stuck between a subservient view of the territory, home for private interests, and the urgent "symbolic need of collective representation", concerning the sense of stability whereof the living is the formal direct translation (Cacciari 2011). The divergence between time of planning and time of architecture brings back the need of the composition as a logical and controlled succession, to express and configure the new as an arrangement of foundational structural steps, while the immediate temporality of the event, now taken as an instrument to repair the post-metropolitan city, expresses by the force of the aesthetics the need for a representation of the variety. The "weakness of public policy and legislation in comparison to the real, massive and continued presence of land and property interests" (Aymonino 1965), shows, in fact, the natural conflict that animates town since its origin, requirig the cohesion of the political forces under themes connecting common purposes.

In the palimpsest of separation of today's metropolis, the triad home-security-nature focuses on the treatment of functional problems of the city through design, one of the terms that has replaced the word "revolution": to say that everything must be designed and redesigned — including nature — implies that it will be neither revolutionized, or modernized (Latour 1993). The uniformly characterized smart city, which tends to eliminate the differences and then the variety of forms of association and organization, let the political purpose of the variety disappear, intended as a in-progress construction of liberty, in the form of successive configurations who can not escape the metamorphic idea of unity, not intended as a target, but as the basis of their overcoming.

References

Argan, G. C. (1965) 'Architettura e ideologia', in: Argan, G. C. *Progetto e destino* (Il Saggiatore, Milan).
Aymonino, C. (1965) *Origini e sviluppo della città moderna* (Marsilio, Venice).
Benjamin, W. (2011) *L'opera d'arte nell'epoca della sua riproducibilità tecnica* (Einaudi, Turin).
Rogers, E. N. (1962) 'Utopia della realtà', *Casabella-continuità* 259.
Cacciari, M. (2004) *La città* (Pazzini Editore, Rimini).
Gregotti, V. (2006) *L'architettura nell'epoca dell'incessante* (Laterza, Rome-Bari).
Hillier, B. (2007) *Space is the machine* (Space Syntax, London).
Ilardi, M. et al. (ed.) (2005) 'Grande Raccordo Anulare', *Gomorra. Territori e culture della metropoli contemporanea* 9 (Meltemi, Rome).
Insolera, I. (1962) *Roma moderna. Un secolo di storia urbanistica* (Einaudi, Turin).
Krauss, R. and Bois, Y. (2008) *L'informe: istruzioni per l'uso* (Mondadori, Milan).
Latour, B. (1993) *We have never been modern* (Harvard University Press, Cambridge).
Menegatti, F. (2014) *Itinerari italiani della residenza collettiva* (Gangemi, Rome).
Nencini, D. (2013) *La Piazza* (Marinotti, Milan).
Perniola, M. (2009) *Miracoli e traumi della comunicazione* (Einaudi, Turin).
Pitch, T. (2013) *Contro il decoro. L'uso politico della pubblica decenza* (Laterza, Rome-Bari).
Purini, F. (1996) 'Il territorio come invenzione formale', in: Moschini, F., Neri, G., (ed.) *Dal Progetto. Scritti teorici di Franco Purini 1966-1991* (Kappa, Rome).
Purini, F. (2005) *Progetti di distruzione* (1991) in: Petranzan, M., Neri, G., (ed.) Franco Purini – La città uguale (Il Poligrafo, Padova).
Purini, F. (2013) *Un aspetto della composizione architettonica,* http://www.francopurinididarch.it/.
Purini, F. (2014) *La città del bene e la città del male*, http://www.francopurinididarch.it/.
Quaroni, L. (1996) *Il progetto per la città. Dieci lezioni* (Kappa, Rome).
Quilici, V. (ed.) (2006) *La trasformazione di Roma*, RAU Rassegna di architettura e urbanistica 120 (Kappa, Rome).

Romano, M. (2008) *La città come opera d'arte* (Einaudi, Turin).
Rowe, C., Koetter, F. (1978) *Collage city* (MIT Press, Cambridge).
Samonà, G. (1976) *La città in estensione* (STASS, Palermo).
Sassen, S. (2005) *The Global City: Introducing a Concept*, The Brown Journal of World Affairs
Strappa, G. (2012) Studi sulla periferia est di Roma (Franco Angeli, Milan).
Ungers, O. M. (1997) *La città dialettica* (Skira, Milan).
Ungers, O. M. (2011) *Morphologie: city metaphors* (Walther König, Cologne).

Non-scientific references

Arlt, G. W. (2014) No More "*Weird Buildings" In Beijing: Pres. Xi Jinping V.S. Prince Charles On Urban Architecture*, http://www.forbes.com/sites/profdrwolfganggarlt/2014/10/19/architecture-and-tourism-in-beijing-and-london/
Forgnone, V. (2011) *OK della giunta a Tor Bella Monaca. Entro un anno al via i lavori,* http://roma.repubblica.it/cronaca/2011/02/16/news/tor_bella_monaca-12537240/
UN Editorial (2014), *World's population increasingly urban with more than half living in urban areas,* http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html
Watson, B. (2014) *What makes a city resilient?*, http://www.theguardian.com/cities/2014/jan/27/what-makes-a-city-resilient

Postwar reconstruction of Mainz as reflection on form and meaning of the traditional city

Maria Irene Lattarulo
DICAR - Department of Civil Engineering and Architecture, Politecnico di Bari, Via Orabona 4, 70125, Bari, Italy
Keywords: reconstruction, Mainz, character, form, city

Abstract

The two World Wars appear as laboratories of modernity and containers of the new urban and architectural forms in terms of reflections on economy of space and materials, and on a new interpretation of the local architectural traditions. Ruined cities are an opportunity to put into practice the principles of Le Corbusier's Trois Etablissements Humains. However modernist planners have to struggle not only with the shortage of capital and building materials, but also with the traditionalist instances of the local communities. Hence the need to build a new relationship with the traces of the local history, the urban models and the traditional building techniques, combining them with the modern ones. The design drafted by architect Paul Schmitthenner in 1946 for the city of Mainz - in response to that advanced by the modernist architect Marcel Lods - aims to restore the quality of the destroyed city taking into account the changed needs of society. Schmitthenner makes proposals for the configuration of the historical center. Particularly he prescribes dimensions and proportions but not the image of the buildings. He does not impose a nostalgic revival of the forms but general rules which allow to hold together the idea of the traditional German city and instances of modernity (traffic, standardization of techniques and materials, health). The experience of the reconstruction of Mainz is a clear example of the relation between architectural heritage and contemporary design, with a reflection on the organic character of the traditional city.

Introduction: postwar reconstruction as a reflection on urban form

The World Wars of the XX century left behind them a trail of wide destructions that modifying the appearance of many European cities. The historical events drive to a consideration of the urban form, and the relationship of the new architectural trends with the architectural heritage. In many cases, in fact, wars appear as laboratories of modernity, image of the new social policies focused on housing, health and education; also they lead to a rediscovery of local values and traditions that were slowly slowly fading out on benhalf of a modernist and internationalist urban development. Among the major questions raised in the aftermath of conflicts, there is the one about reconstruction: theoretical considerations, building regulations, political influences, urban experiments will fuel the debate to redefine the image of the city.

"The reconstruction of a city can be approached from two extreme points of view. You can rebuild what has been (...). But these reconstructions would would lead to *Filmstädte*, architectural lies because life today does not suite to the old urban patterns. It would also be an unworthy way. The second approach would be to trample on the past, ignoring the history of the city and to shape the new simply as something material (...)[1]».

The ruined city meet the demands of making a *tabula rasa* by the modernist urban planners, but they must deal not only with the shortage of capital and building materials, but also with nostalgic instances of local communities. Hence the need to build a new relationship with the traces of local history, parcellings, urban models and traditional building techniques, combining them with modern techniques and requirements, and supporting them through reflections on form and the meaning of the urban space.

This means that «the policies of modernization did not necessarily imply to the renewal of form, and they could find their expression in the language of tradition, opposed to both eclectic historicism and most extreme modernism[2]».

Karl Gruber, professor of architecture at the Darmstadt Technische Hochschule and expert on the historical development of the German city, at a conference in 1946, writes: «Our ancient cities are the highest expression of traditional values in visible form, entrusted to our nation as a precious heritage to be preserved. They are the lithic expression of our history, and from each of the ancient German cities, which is much more than just a romantic experience during a summer trip, the anxious question arises: the names of Cologne, Lübeck, Rostock, Mainz, Augsburg, Munich - avoiding here to mention all the sad list - will only mean the memory of a now defunct beauty that will be forgotten in the death of the current generation, so that future generations will be poor in evidence of the past? Well, we tend to think of the monuments of great value in German history, our cathedrals and town halls, and passionate to individual buildings, but the old German city was more than just a sum of artistic buildings [*kunstvoller Bauten*]: it was expression of the spiritual and social order that once existed[3]».

This means that - according to Gruber - the reflection on urban form after the destruction caused by the war bombing affects the whole urban fabric, not only the main monuments (both sacred and secular). Gruber acknowledges in the urban elements the "stony expression" of a social order and the manifestation of common urban design principles in spite of the individuality of the citizen and in the diversity of the outcomes.

In the same essay, he writes that "as in life free citizens live next to free citizens, so in the city the house [*Bürgerhaus*] is next to the house; there is freedom in the arrangement of the window openings, the bow-window, the entrance - but these modifiable things are related to a building type, in which the main elements are determined: from the

[1]K. Gruber, *Darmstädter Wiederaufbaufragen* vom 9. März 1946, in Romero, A. (1990) *Baugeschichte als Auftrag*, p. 192, cit. in *Darmstadt im Plan von Morgen*, in «Darmstädter Echo», 13.03.1946, 1. Jahrgang, Nr. 33.

[2]Cohen, J.L., Frank, H., (April 1990) 'Architettura dell'occupazione: Francia e Germania 1940-1950', *Casabella* 567, p.40.

[3]Gruber, K. (1946) 'Der Wiederaufbau zerstörter mittelalterlicher Städte', in *Die Welt des Ingenieurs*. Carl Winter Universität, Heidelberg und Darmstadt, p. 89.

foundation of the town, the breadth and the depth of parcels, the overall dimensions of the buildings stem, defining the slope of the roof, the mass and the relief of all the joints, in particular the window (...)[4]».

These reflections, developed by one of the greatest scholars of the German city, are important to understand the debate on the ways of the reconstruction: different values and meanings attributed to the traditional city determine a different (and sometimes contrasting) character of the projects of reconstruction. In many cases they appear utopias because projects are very far from reality, according to an ideological point of view and considering the real chances of execution of the plan.

"So the general problem of the reconstruction of our cities lies the issue of whether this mass of residential buildings will be designed in the town center without giving up the hygiene requirements and social issues of our time, also allowing to find in it the scale and the rhythm of the ancient city[5]».

Urban utopias compared: the reconstruction of Mainz

Mainz[6] was one of the cities where the debate on the reconstruction was centered on the comparison between opposing and contrasting urban theories. Air raids on the city began in August 1942; and since 1945[7] Mainz was incorporated in the area of the French occupation. Since the early months of the German occupation (1945-1950), military government leaders of the French zone undertook a very active policy of construction and reconstruction. Mainz, the capital of the French zone since 1946, was the object of one of the most important initiatives. The French military government asked Marcel Lods (1891-1978), the French modernist architect, follower of Le Corbusier, to draw up a reconstruction plan for Mainz. In his task, Lods was joined by Adolf Bayer (1909-1999), student of Otto Ernst Schweizer (1890-1965) of Karlsruhe and one of the leading exponents of the ribbon city in Germany.

Lods' drawing was based on le Corbusier's *Trois etablissements Humaine* and on the postulates of the Athens Charter of 1933, prepared in former years to meet the challenges related to the development of the modern city. His plan generated strong opposition, first within the administration of the city, then, after it was publicly presented in January 1948, within the local community. The project, in fact, not only demanded far more resources and time for the reconstruction of the city compared to what the citizens have tolerated, but completely altered the character of the city (through the distinction of urban areas according to functions: residential-commercial-productive).

For this reason, the mayor Emil Kraus and the official city planner Erich Petzold asked collaboration to the Alsatian architect Paul Schmitthenner, Petzold's master. Schmitthenner presented an alternative plan to that by Marcel Lods, where he decided to put into practice the principles of *Stadtbaukunst* (art of building the city, rather than *Städtebau,* urban planning) developed in the "Stuttgarter Schule", to which he belonged. The issue was very complex, not only from a technical perspective but also ideological: it was not the simple development of an urban project, but the reconstruction of a big city, full of tradition, heavily damaged by the bombings of World War II. Schmitthenner's draft, however, appeared equally utopian because still too tied to the image of the traditional city, and in contrast to the economic interests linked to the pension soil.

Both Lods'"modernist" project and Schmitthenner's "traditionalist" ones were eventually rejected, but remain testimonies of two different ways of thinking the city in the mid-XX century. The two projects, in fact, provoked reflections on the urban form, on those elements that traditionally give meaning and influence the character of the city, and that reflect the identity of a community. The citizens of Mainz did not recognize themselves in the urban model proposed by Lods, based on the principles of functionalism but far from

[4]Gruber, K. (1946) 'Der Wiederaufbau zerstörter mittelalterlicher Städte', p. 90.
[5]*Ivi*, p.89.
[6]Since 1950 the state capital of the Rhineland-Palatinate.
[7]Yalta Conference, 10 February 1945.

Figure 1. K. Gruber, Plan of Reconstruction of the area around the Cathedral, Mainz, 1949

the image of the compact city to which they were accustomed. On the other hand, they did not want to give up the modernist instances related to traffic, new materials, and the opportunity to live in healthier and brighter city than the medieval ones.

Also Gruber expressed his first considerations and developed a reconstruction project for Mainz soon after the bombing of summer 1942. Opposing to those projects planned to completely clear the view of the Cathedral (such as those for Ludwigstraße already processed in 1944 by Adolf Bayer), he was in favor of restoring the quality of the urban medieval space, in which «the great buildings of the medieval churches were completely surrounded by subspaces whose meaning was to accommodate doorways and entrances to the space of the church[8]» [Fig .1], respecting the principles of the *Denkmalpflege*.

[8]K. Gruber, in Durth, W., Gutschow, N. (1988) *Träume in Trümmern. Planungen zum Wiederaufbau zerstörter Städte im Westen Deutschlands 1940-1950*, Zweiter Band, p. 872.

Lods' "Plain de Mayence" and the principles of the Charta of Athens

The first sketch of the "modernist" reconstruction drawing was developed in May 1946 and remained essentially unchanged until Lods left Mainz in 1948. The pattern of old historic road around the cathedral would remain essentially the same, although some roads would be widened; only for some of the main monuments reconstruction was planned. Lods' main intervention concentrated in the north and west area of the old town.

Lods' masterplan provided therefore a clear separation between residential and industrial areas. The first ones, built in a way that ensures optimal ventilation and sunshine, predicted high residential buildings up to eight to ten floors, interspersed with green areas and spaces designed for school buildings and recreational facilities. Through his project, Lods overlapped indifferently to the urban traces of the former city, with a rigid and serial composition of building blocks. The road system was set on a rectangular grid. The civic center of the new city - the government and business center- stood in a new area designed between the old historic center and the new residential district. Lods planned to relocate the industrial area, the new airport and the main roads and railway lines along the Rhine. Lods imagined Mainz as a new ribbon city stretching from Wiesbaden to Frankfurt.

Lods's draft was strongly supported by a propaganda campaign based on the G. Hanning's designs, which opposed the light to the darkness, or the new city green and bright as a response to the old city messy and unhealthy [Fig. 2].

His plan, however, based on a functionalist idea, faced strong opposition of the local community. The citizens of Mainz simply wanted to return to the city they knew and to a sense of normalcy, without waiting or making sacrifices for the realization of a scheme, which they considered utopian.

In the above-mentioned Gruber's lecture delivered in 1946 we finds an invective against the modern city, of which Lods' plan for Mainz is the most striking example. «If we look at the new neighborhoods of our cities, we find that the idea of "citizen by the citizen" [*Bürger neben Bürger*] has disappeared. The mass of our dwelling houses [*Wohnungen*] consists of prefabricated rental apartments [*Mietwohnungen*] assigned to unknown future residents; there are common stairwells that often serve up to a maximum of 8 floors, piled on each other horizontally, whose inhabitants change several times within a decade. The architectural character of rented apartments is that of a mass of residential buildings; that is the more evident as longer and higher are the buildings. It would also be possible with these houses, especially if it is a completely new project, achieve spacious architectural effects, but something of the "mass rabbit hutch" [*Massenkarnickelstall*], such as residential buildings in urban industrial Soviet cities, is always present in this kind of buildings[9]».

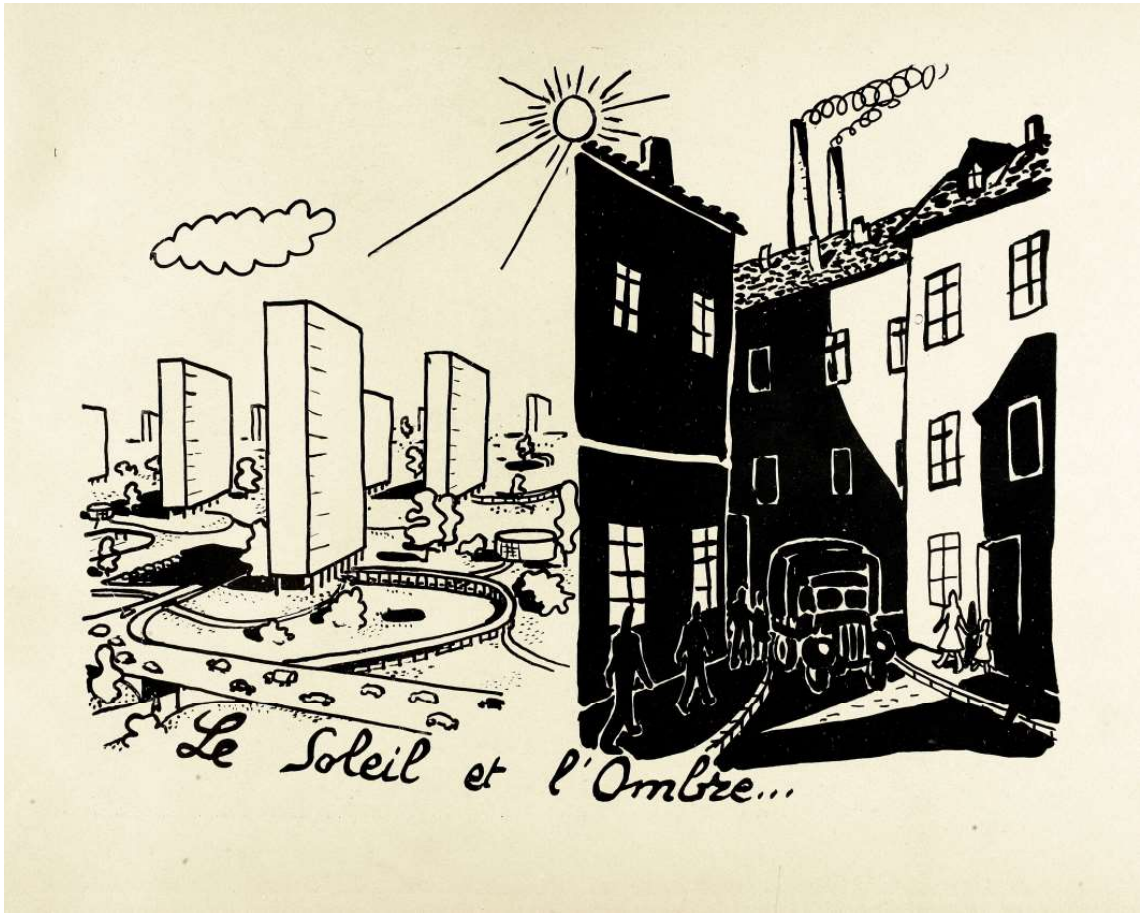
A new old town: Paul Schmitthenner's drawing for Mainz

Paul Schmitthenner's plan of urban reconstruction, developed in response to Marcel Lods'one and presented to the competent authorities in October 1947, focused on the area of the old town. Presumably this was a way to avoid a direct confrontation with the "modernist" plan, focused instead on the area of the former new city developed during the industrial revolution, and to open up to a possible future collaboration with Lods. However, Schmitthenner's proposal concerned the bridges over the Rhine and a modernization of the road network, whose effects would have had repercussions far beyond the limits of the ancient city.

In a handwritten report, dated 10 July 1947, Schmitthenner writes: «Despite the heavy destruction of the old city, it should not be neither a complete redesign [*Neuplanung*] and rebuilding [*Neuaufbau*], nor a simple reconstruction [*Wiederaufbau*] of past. It is simply to establish the urban planning on the values left, in order to create a healthy and

[9]Gruber, K. (1946) 'Der Wiederaufbau zerstörter mittelalterlicher Städte', p. 92-93.

Figure 2. G. Hanning 1948, Drawing from a series commissioned by the architect M. Lods to illustrate the project for Mainz and the principles of the Athens Charter. Stadtarchiv Mainz



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vital urban fabric[10]». Schmitthenner's project was based on the principles developed in the School of Stuttgart [Stuttgarter Schule], expression of a policy aimed at recovering traditions, local materials, building values. In this case the *Stadtbaukunst* was called to deal with the issues related to post-war reconstruction, where the principles that had supported the experiences of the years before the war were compared with the needs related to the "emergency configuration", theorised by Paul Schmitthenner in 1943. In his essay "Denkschrift zum Wiederaufbau von Köln" (Memorandum for the reconstruction of Cologne), unpublished, he wrote: «Instead of the provisional, where possible we have to build the definitive, as well as the necessary to face the emergency. The real question is if to solve the necessary through the provisional or if to give a shape to the emergency».

The architecture of the Stuttgarter Schule had the right theoretical framework to face the problems of post-war reconstruction: moderation and simplicity, sense of historical continuity, consideration of local traditions and aspirations of local communities. For this reason its exponents often clashed with those who advocated the break with the past and the total renovation.

In the draft for Mainz, Schmitthenner took into account the reflections he elaborated

[10]P. Schmitthenner, "Erläuterungsbericht zu dem Bebauungsplan der Altstadt Mainz. Text zum Planungsgutachten von Paul Schmitthenner – Kurze Fassung vom 10 Juli 1947", in K. Gruber, in Durth, W., Gutschow, N. (1988) *Träume in Trümmern. Planungen zum Wiederaufbau zerstörter Städte im Westen Deutschlands 1940-1950*, Zweiter Band Städte, p. 940.

for the reconstruction of Freudenstadt, in 1946, through the rebuilding of *Giebelhäuse*[11] on Marktplatz.

For the reconstruction of Mainz, Schmitthenner started to restore the traces - and thus of the qualities - of the ancient city, to build on it a new urban fabric that would adequately respond to the new technical and formal issues of modernity. The architect writes on the subject: «The city streets are almost preserved and carry very significant values[12]» and yet «in defining the new roadway, it was necessary - from simple economic considerations – to use, as far as possible, the existing sewerage systems without ignoring their direction[13]». Through these simple considerations, the project did not only meet the requirements dictated by the contingency of the postwar sistuation (time and limited resources) but also ensured a continuity with the destroyed city.

In fact, the maintenance of the road network, and therefore of the size of the urban parcels, made sure that the old proportions of the damaged buildings were re-proposed, both they were completions, reconstructions, and new architectures. In some cases, however, a widening of the road sections was imagined: Schmitthenner's plan, although more conservative than Lods', did not aimed to recreate the overcrowded neighborhoods (slums) destroyed by war.

Schmitthenner planned to limit the height of the buildings within a maximum of three levels (11-12 meters)[14] so that the Cathedral lingered the dominant element [*Stadtkrone*] within the urban fabric. It emerges in a sketch made by Schmitthenner - dated Ocrober 1946 - for the area around the cathedral, where each building has a number of stories (*Stock*). This drawing shows Schillerplatz (left) from which the Ludwigstraße, with a slight change of direction, leads almost directly to the Rhine. All around the Cathedral other small squares and streets open. On the bank of the Rhine there is a large square with a tower and the city hall. This piece of city, in the heart of old city, had been the subject of other project proposals, and others followed the Schmitthenner's plan.

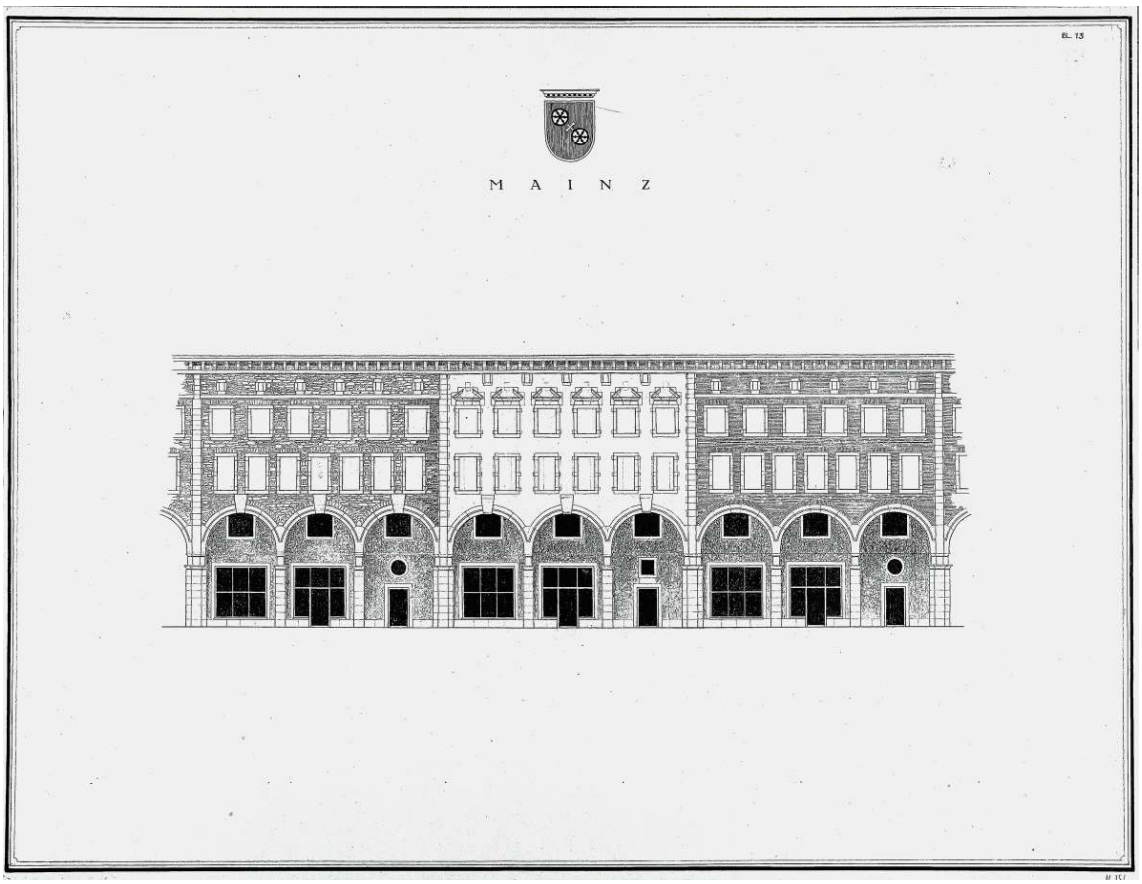
As for the other important buildings within the urban fabric, «There are valuable historical buildings more or less heavily destroyed as, among others, the palaces on Schillerplatz and Schillerstraße, the Kurfürstliche Schloß, the Deutsche Haus and several medieval churches, whose conservation, or certainly also the restoration, will be vital necessities not to be neglected[15]».

Another feature of Schmitthenner's design, which resumes Gruber's lesson on the importance of individuality in uniformity, concerns the possible variations on the theme of the house. Schmitthenner prescribes dimensions and proportions, but not the image or the external appearance of the buildings. He therefore does not impose a nostalgic revival of the forms, but he only gives information about the general character of the architectures. This is clear from the studies for the same building: in this way Schmitthenner tries to demonstrate, through variations, the range of the possible configurations as a result of different choices of materials [Fig. 3, 4]. Some projects for commercial buildings in Ludwigstraße, one of the major road in the old town of Mainz, are preserved, as well as plants, also studies of façades. In some cases Schmitthenner proposes to leave visible on the façade the material from the rubble, to keep alive the memory of the war.

However, the most innovative contribution is to develop variations on the theme of the three storeys-building, with arcade at the ground floor. In the more "traditional" variant, inspired to the image of the Renaissance city, the bays are marked by the rhythm of the arches. Openings in the upper storeys have their own indipendent rhythm (sometimes coupled, sometimes included in a series), if compared to the rhythm of the other storeys. This autonomy seems to contradict the law of the transfer of the vertical loads of the structures along continuous lines of force (as it would be normal in a masonry building. It finds his justification in the image of the traditional German facades in Fachwerk,

[11]Different from the plan of *Traufenhäuse* proposed by Ludwig Schweizer, and realized.
[12]Durth, W., Gutschow, N. (1988) *Träume in Trümmern*, p.940.
[13]*Ibidem*.
[14]Durth, W., Gutschow, N. (1988) *Träume in Trümmern*, p.941.
[15]Durth, W., Gutschow, N. (1988) *Träume in Trümmern*, p. 941.

Figure 3. P. Schmitthenner, Sketch of the reconstruction of a building in Ludwigstraße, 1946, 'traditional' facade. Stadtarchiv Mainz



where the trellis structure allows each floor is released from the loads of upper structures, thus ensuring some freedom in the placement of the openings. However, its apparent "irregularity" is associated to an order and regularity typical of the Renaissance urban facades. These facades are a sort of continuous scenic backdrop along one of the city's main roads leading into the city center.

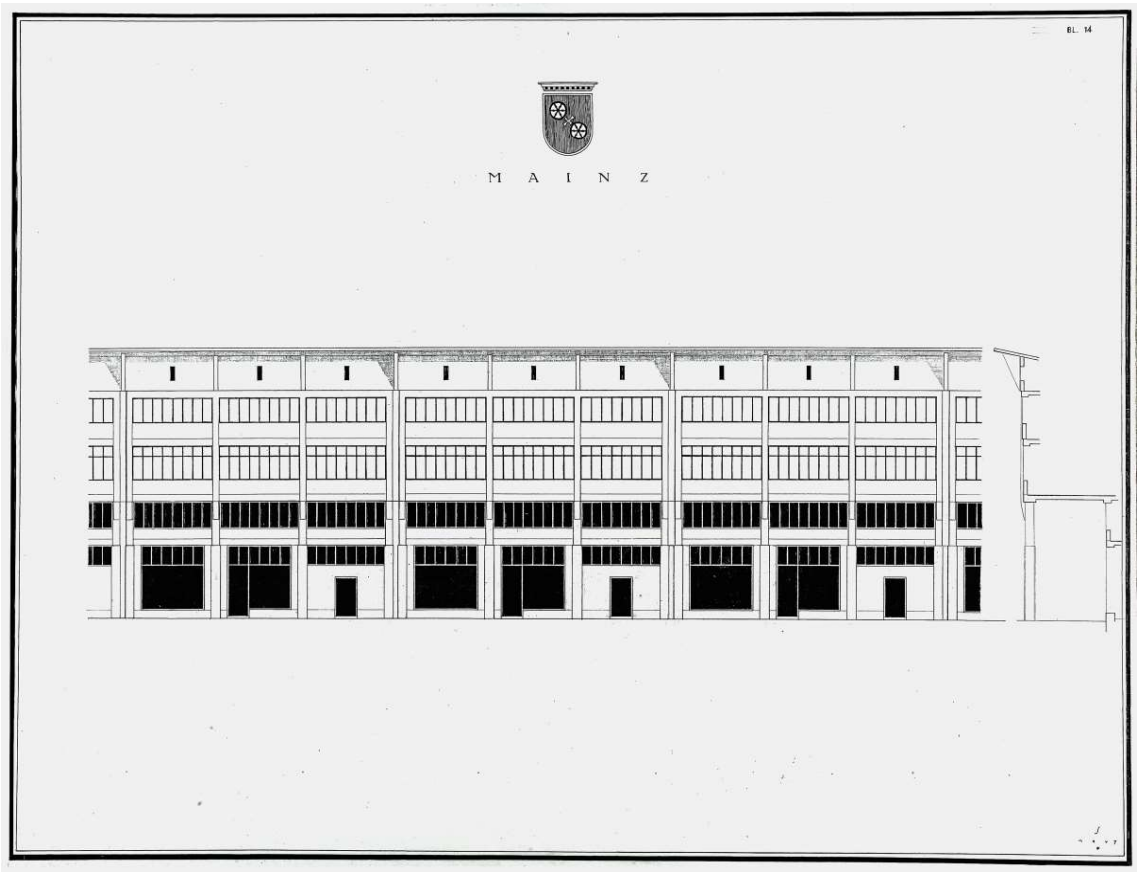
In the most "modern" variant of the facade in Ludwigstraße, however, the regularity of the structure in serial prefabricated elements prevails. The arches are replaced by horizontal lintels, and openings run uninterrupted throughout the facades, like windows *en longeur* supported by a reinforced concrete frame.

On the ways of reconstruction, Schmitthenner focuses on the relationship of contemporary design with the architectural heritage escaped the destruction. It has not to be, in his view, of a nostalgic relationship, which would inevitably lead to the imitation of forms and to the construction of an architectural lie ("Architektonische Lügen" according to K. Gruber), but the recognition - to the buildings of the past - of a value of the Ancient (*Alteswert*, quoting Riegl) the new projects of completion or reconstruction should consider. «The respect for the great achievements of the past is a natural thing. But if this respect degenerates into sentimentality, it becomes negative. So, of course, we have to respect the Cathedral, and also buildings like the castle, the palaces of the XVIII century and the medieval churches. These require more careful consideration while planning[16]».

The Alsacian architect, in his report on the plan of Mainz, facing the inevitable comparison with the ancient town, wonders about the issue of the architectural style: «old or

[16]*Ibidem.*

Figure 4. P. Schmitthenner, Sketch of the reconstruction of a building in Ludwigstraße, 1946, 'modern' facade. Stadtarchiv Mainz



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new style? The question arises only among those who do not know that style is an expression of the attitude and the mental representation of the unity of all spheres of life. Those who see in "style" only exterior features mix up style and shape and remains trapped in formalism[17]».

From these aspects, it is clear the distance between Schmitthenner's and Lods' plan. The differences reveal a different way of thinking the city, and dealing with the architecture of the past (present both as traces in the territory and as buildings). The Schmitthnner's design, called "traditionalist" in comparison to Lods's design, was not limited to the repetition of the image of Mainz before the war, but was looking for a compromise with modernity. It aimed to restore the quality of the destroyed city, taking into account the changing needs of the population and the demands of modernity (traffic, standardization of techniques and materials, hygiene), and contained typological proposals for a future reconstruction of the buildings.

As already mentioned, Schmitthenner's design met the opposition of the people, especially the owners of land in the city center, due to the low utilization of the main areas of the city. Schmitthenner's opponents, represented by Lods' figure and ideas, did not appreciate the revival of a compact city, far from the "modernists" and "functionalist" principles of the Athens Charter.

[17]Durth, W., Gutschow, N. (1988) *Träume in Trümmern*, p. 942.

Tradition and Modernity in the interpretation and in the project of the city in the twentieth century

The case of the reconstruction of the city of Mainz, through the comparison between the Lods' design to Schmitthenner's, raises questions and reflections on the idea of the city, in particular with respect to two fundamental issues. The first concerns the form and structure of a urban settlement to which people can give the meaning and value of "city": breadth of the tracks, parcels size, proportions of the buildings, perspective views, hierarchies between public and residential buildings. The citizens of Mainz, in fact, take position agaist Marcel Lods's proposal because too far from their way of thinking about the city: compact, on a human scale, built - remembering Gruber - as sum of autonomous elements within a system, each with its own identity while held together by common laws that are dictated by the formation and growth process of the city over the centuries.

The "rabbit hutch mass" [*Massenkarnickelstall*] designed by Lods, although perfectly met the criteria for ventilation and sunshine, were seen as carriers of an image of the city far and different from the traditional one, in which people found it hard to recognize themselves. Schmitthenner'drawing, on the other hand, tries to mediate the revival of the image of the historical city with the demands of modernity, but it is equally opposed.

The second issue, that is a major issue arose after World War II, it is the ratio of new projects and what was still standing of the historic city. How then intervene on damaged architectural heritage? Through instances of continuity (for imitation and revival of forms) or by establishing a contrast between the situation before and after the war in order to keep alive - as a warning - the memory of the historical event?

The question of "how to rebuild" had in Germany several and different outcomes. Interesting is, for example, to compare the ways of reconstruction in cities like Munich and Stuttgart, both in southern Germany. Because of the intervention of different factors (political and ideological) - not analyzed here - the reconstruction of Munich is more geared to the preservation of architectural substance, to the maintenance of the tracks of the war through "signs" [*Spuren*] on the buildings (as on the southern facade of the Alte Pinakothek rebuilt by Hans Döllgast) or gaps in the dense urban fabric of the historical city. In Stuttgart, however, a more modern approach prevails: currently, along the main city roads – like Könisgtraße - ancient buildings stand next to modern buildings, in a counterpoint that makes more complex and uneven the character of the city.

After World War II, therefore, the discussion about the city - begun in the early decades of the XX century - is enriched with new issues: the opportunity to make a clean sweep of the old urban structures to actualize the principles of "modern city" inevitably collides with the principles of the traditional city. It is not just a matter of nostalgia associated with the historical image of the city: communities simply did not want to give up those urban elements (tracks, proportions, hierarchies) that remain unchanged over the centuries and that have meaning because of the history and the processes from which they spring.

Schmitthenner concludes his paper on the reconstruction of Mainz claiming that «*Wiederaufbau is a spiritual issue, the building only its last material expression*[18]».

[18]Durth, W., Gutschow, N. (1988) *Träume in Trümmern*, p. 942.

References

Gruber, K. (1946) "Der Wiederaufbau zerstörter mittelalterlicher Städte", in *Die Welt des Ingenieurs.* Carl Winter Universität (Heidelberg und Darmstadt) 89-103.
Durth, W. and Gutschow, N. (1988) *Träume in Trümmern. Planungen zum Wiederaufbau zerstörter Städte im Westen Deutschlands 1940-1950,* Zweiter Band Städte (Friedr.Vieweg & Sohn, Braunschweig Wiesbaden) 867-942.
Romero, A. (1990) *Baugeschichte als Auftrag: Karl Gruber: Architekt, Lehrer, Zeichner, eine Biographie* (Verlag Vieweg, Braunschweig).
Cohen, J.L., Frank, H., (April 1990) 'Architettura dell'occupazione: Francia e Germania 1940-1950', *Casabella* 567.
Diefendorf, M. J. (1993) I*n the wake of war – The reconstruction of German cities after World War II* (Oxford University Press).
Voigt, W., Frank H. (Ed.) (2003) *Paul Schmitthenner* 1884-1972 (Wasmuth).
Cohen, J. L., Frank H. (ed.) (1013) *Interférences/Interferenzen - Architecture Allemagne-France 1800-2000* (Éditions des Musées de Strasbourg).
Düwel, J., Gutschow, N. (2013) *A blessing in disguise. War and town planning in Europe 1940-1945* (DOM publishers).

Chair_Carlos Dias Coelho I Alessandro Camiz
FormaUrbis Lab - CIAUD - Faculty of Architecture - University of Lisbon, Portugal
Faculty of Architecture, Design & Fine Arts, Department of Architecture, Girne, TRNC
Co-Chair_Marta Burrai I Valentino Danilo Matteis
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Form and Theories

Urban Form and Meanings

Reading Urban Form

Urban Morphology Methods

Fringe Belt Analysis

An operative experience of urban morphology: Mazatlán, Sinaloa, Mexico, jenuary-february 2015

Giancarlo Cataldi, Jacopo Montemagni
Dipartimento di Architettura. Università degli Studi di Firenze. Via della Mattonaia, 14. 50121 Firenze
Keywords: Mazatlán, Sinaloa, México, territorial planning, urban morphology, reading-project

Abstract

On the occasion of the International architecture and urbanism workshop that has taken place in the months of January and February 2015 in the city of Mazatlán (Sinaloa, Mexico), the authors have played out the reading-project methodology of the Italian type-morphological school, experimentally applied for the second consecutive year (Cataldi, Urios and others, 2014; Cataldi, Montemagni, 2015) to the Mexican context of the Sinaloa State.

The reading starts, as usual, from a wide territorial scale, to focus to a regional scale, and then to the urban web and to the research on the city historical development. At first the main route, which is believed to have affected the origin of the city, has been identified. As a matter of fact the shape of the coast, with a headland and a cove, has encouraged the settlement of the harbour and the origin of Mazatlán city center. On the urban scale, the different types of blocks that shape the current set allow the recognition of the various stages of urban growth.

Introduction

Into the framework of the International Architecture and Urban Planning Workshop 2015, held in Mazatlán, Sinaloa, Mexico, it has been given the chance to a group of professors and students in architecture to place the first contact with this beautiful seaside town. The workshop has been managed by the INTHAB, Instituto Tecnológico del Hábitat, led by the architect Juan Cano Forrat. The TAU Mazatlan 2015 has taken place between the 17th of January and the 6th of February, with the participation of six European and six Mexican universities: University of Florence and Polytechnic of Milan (Italy), University of Porto (Portugal), School of Architecture of Stavanger (Norway), School of Architecture of Strasbourg (France), Polytechnic University of Valencia (Spain), Universidad Autónoma de Durango (UAD), Universidad de Guadalajara (UDG), ITESO - Guadalajara, Universidad Autónoma de Mexico (UNAM), TEC - Monterrey, Universidad Autónoma de Sinaloa (UAS). The technical services of the municipal government of Mazatlán have provided the cartographic databases, analytical documents and urban planning of the city.

In this context the authors have played out the reading-project methodology of the Italian type-morphological school, that follows Saverio Muratori's teaching. In his opinion, urban planning has ceased to be a cultural device deeply rooted in history, following the Modern Movement theory, and only a systematic understanding of history's laws of transformation - the *operative history* - could recreate the role previously claimed by urban design. This experimental application has been done for the second consecutive year in the Mexican State of Sinaloa. In fact the same process had been developed for the city of Guasave (Cataldi, Urios and others, 2014).

Geographical collocation and historical origins of Mazatlán

The first aspect that has been taken into consideration to start the reading of the city is the geographical collocation and its relationship with the territory and the cities in the surroundings. Situated in the southern coast of Sinaloa, on the Pacific Ocean, Mazatlán, a Nahuatl word that means "place of deer", is not the original name of the first Spanish port enclave.

As a matter of fact in 1531 settled in the place 25 Castilian coming from Culiacan, capital of the state today, commanded by Don Nuño de Guzmán. The first colony known was called "Villa of Costilla", from the family name of a soldier from the "Presidio" (now Villa Union) that arrived at the port area in order to monitor the shipments.

During the Age of Discovery it was not easy to cross the rivers, even because the large Mexican rivers used to overflow in the rainy seasons. For this reason people used to travel along the ridge paths, supposedly like ancient populations all over the world.

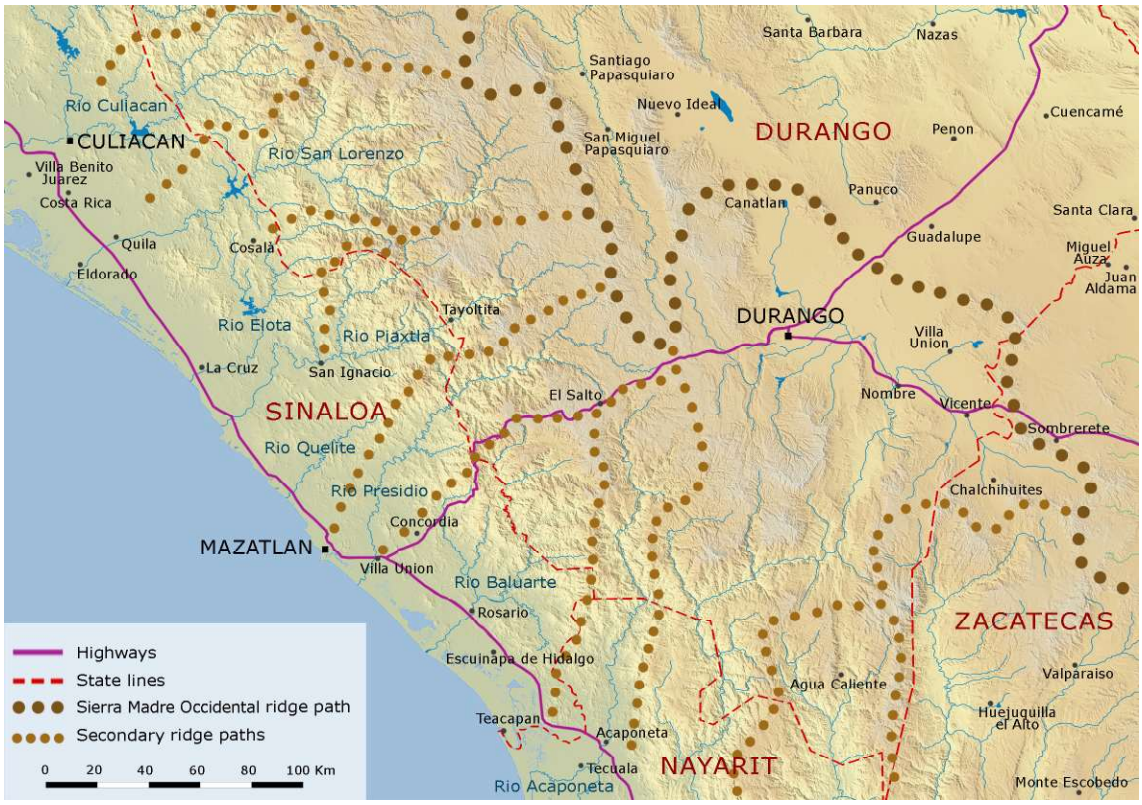
So it is supposed that the Mexican territory was mainly travelled passing throw the Sierra Madre mountains. The actual capital of the Country, Mexico City, occupies the same strategic position of the ancient capital of the Aztec empire, Tenochtitlán. It stays on the main watershed, in the center of the country. In the northern part of Mexico the watershed splits into two: the Sierra Madre Occidental and the Sierra Madre Oriental, with a wide plateau between them. At a certain point the Sierra Madre Occidental watershed draws a wide arch: following the shortcut, we can find Durango, the most important city of the region.

From Durango it is possible to reach Mazatlán passing by a secondary ridge path, on which there are the cities of El Salto and Concordia, and then crossing the Presidio river in Villa Union.

Moreover, still nowadays, the Federal Highway 40, that links the two coasts of Mexico, follows that path from Mazatlán till Durango, to continue reaching Monterrey, on the Sierra Madre Oriental, and finally arriving to Matamoros, on the Gulf of Mexico, by the United States border.

After these considerations, it seems quite clear that Mazatlán was born as the seaside terminal of this important transversal connection.

Figure 1. Mazatlan's connections: ancient ridge paths and modern highways



The development of the city

As it was said in the previous paragraph, we consider that the settlers of Mazatlán reached its territory by walking on the ridge paths. For this reason, at first it was analyzed the fruition of the territory before the city itself. In this way it is plain to understand how the physical structure of the territory deeply influenced the shape and the evolution of the original settlement.

The first hill that we can find following the ancient path for Mazatlán is the *Cerro de la Montuosa*, after which the watershed splits into two: one follows the *Cerro del Cristo Rey* and ends with the *Cerro de Casamatta*; the other one continues to the *Cerro del Obispado*, *Cerro de la Neveria* and ends with the *Cerro del Vigia*. The founders decided to build the first port enclave on the plan by the ancient coast line, protected from the main winds from the *Cerro de la Neveria* (Figure 2).

The actual *Calle J. Carrasco*, that has replaced the watershed path, would have probably led to the main city entrance, at the corner between the longitudinal axis of the first settlement, that was *Calle B. Dominguez* (already *Calle principal*) and *Calle J.M. Canizales,* probably traced aligning the two more advanced hills by the ancient coast line. Moreover the transversal axis of the city was *Calle Angel Flores*, the first plain street that could be traced after the *Cerro de la Neveria* and the *Cerro de Casamatta* : this was the easier path to bypass the headland. Instead *Calle Constitutión* was, in this first phase of the settlement, the more advanced street by the ocean and would have followed the ancient coastline.

In the second phase (Figure 3), approximately at the beginning of the IXX century, as the coastline has gradually advanced, Mazatlán has already doubled itself in a geometrical reason, expanding to south and to east. In this way the previous east boarder of the city, *Calle Carnaval*, became the new longitudinal axis, while the previous south boarder, *Calle Constitutión,* became the new transversal axis. At the corner of the new axes was born *Plaza Machado*, the new city center, with his particular triangular shape,

Figure 2. Mazatlán, the original settlement (phase 1)

due to the direction of a path that was outside of the first settlement and that used to bend to the *Cerro del Vigia*, following the ancient coastline.

The third phase of expansion of the city finishes around the 1950 (Figure 4): with this urban plan we can consider Mazatlán city center completed. As a matter of fact, this is the last expansion that follows the original grid orientation, saturating all the promontory from the west to the east coast.

The third and last longitudinal axis is *Calle A. Serdán*, that divides the headland in two equal halves. On the other hand, in this phase there are two main transversal axes: *Calle M. Ocampo* and *Calle I. Zaragoza*. At the corner between *Calle A. Serdán* and *Calle M. Ocampo* there is the market, the trading core of the city, while the corner between *Calle A. Serdán* and *Calle I. Zaragoza* becomes the central traffic hub, where also ends *Calle J. Carrasco*.

Actually *Calle M.Gutierrez* represents the northern limit of the city center: in fact this street follows the physical boarder of the headland. Hence the modern city continued its growth, but changing orientation, in strong discontinuity with Mazatlán ancient core.

Avenida M.Alamán represents instead the southern limit of the city center and it follows, more or less, the coastline of that age. Instead the residential district *Fraccionamiento Playa Sur* belongs to another phase: it is a modern expansion that was made possible due to a big work of soil movement.

Figure 3. Mazatlán, the doubling of the city (phase 2)

Finally, the red numbers on the map represents the various city centers in the history of Mazatlán: it is clearly shown how they have historically moved following a central position, from the old town to the new city expansions.

Conclusion

This reading of the city of Mazatlán has been carried out just examining carefully the actual cadastral map and walking along the city center, trying to find out signs that could help to individuate the first historical settlement. In fact the oldest Mazatlán map in our possession dates back to 1871, in which it is clearly recognizable the second phase of the city.

The authors of the article believe that this reading of Mazatlán should be taken into consideration not only for historical interests, but also by the architects that are asked to develop a city center plan. For example, on occasion of the Mazatlán Workshop 2015, a group of students have produced a public transportation plan for Mazatlán city center, taking the third phase map as a starting point to elaborate new ideas to solve the traffic problems of the actual city.

References

Cataldi, G. and Maffei, G.L. andVaccaro, P. (2002) *Saverio Muratori and the Italian school of planning typology*, in "Urban Morphology", vol. 6, n.1, 3-14.
Cataldi, G. (2003) *From Muratori to Caniggia: the origins and development of the Italian School of design typology*, in "Urban Morphology", vol. 7, n., 19-34.
Cataldi, G. (2005) *Dialectic pairs in urban research: some epistemological issues*, in "Urban Morphology", vol. 9, n.1, 46-48.
Cataldi, G. (2005) *The study of territory and the role of history in applied research in urban morphology*, in "Urban Morphology", vol. 9, n.2,122-126.
M. Martini, (2004) *Grandeza mazatleca* (Grupo Alerta, Mazatlán, Sinaloa, México).
Noriega, S.O. (1999) *Breve historia de Sinaloa* (Fondo de Cultura Económica, El Colegio de México, México).

Study of Liegi's types and specialized buildings

Cristina Piccione, Giulia Pulimeno, Elena Savino, Matteo Ieva
Dipartimento dICAR, Politecnico di Bari, Via Orabona 4, 70125, Bari, Italy

Abstract

The research elaborated in the final workshop in the city of Liege, established by the department dICAR in the Polytechnic in Bari, deals with study of specialized and basic buildings typically developed in the city of Liege. Particularly interesting is the confrontation with the building types constructed at first in the Italian peninsula of which we have a sufficient knowledge thanks to the studies made by the School of typologies. The reconstruction of the case of housing types in the Francophone city shows the presence of row house, in the north of Europe called house Mitoyenne, which seems developed in this cultural area since the XII century. The housing complex that appears in the primeval medieval buildings of the city shows two different, principal dimensions which can change essentially in the width of the façade on street. They are recognizable row house with front, tread mt. 3-3, 50 and row house with front mt. 5-5, 50; both with a variable depth around mt. 12-15 and over. They function as a clear social divide, typical of Liege's society. Other character particularly far from the building type existing in the Italian area is, together with very inclined pitched roof that above all in the first construction show the watershed line perpendicular to the front road, the very permeable façade declaring its membership to the elastic-wood cultural area recognisable in the north European boundary. The diachronic transformation processes of the type are more similar to the Italian cities: vertical increase, coinciding with the progressive substitution of trellis with brickwork, multifamily houses, as well as recast in units of higher grade to form the in-line house. In the matter of specialized buildings, is important to note the huge realization of Romanic churches which being classified in the ecclesiastic order as "collegiate", are not organized related to urban space; they never have the entry axis in the main aisle but mediately the crossing of a narthex that permit the lateral access. The serial types show sometimes an excessive repetition of the bodies organized without never developing important nodal points.

Introduction

The research about the city of Liegi has been produced within the activities of the Final Workshop of Degree, coordinated by the Prof. M. Ieva with the students: R. Ieva, R. Natale, D. Ranieri, C. Piccione, G. Pulimeno, E. Savino, in course of Degree in Architecture - Department DICAR of the Polytechnic in Bari.

It has been elaborated thanks to the colleague's of the university of Liegi precious contribution, in particular, P. Hautecler, R. Occhiuto, M. Goossems, with which the achieved results have been shared.

The study describes, synthetically, the Liegi's typological process of basic (residential) and special buildings. It's based on the fundamental notions of *building type* and *organism*, according to the meaning proposed by the school of Italian typology, that finds in the figures of S. Muratori, G. Caniggia, G.L. Maffei, G. Cataldi and G. Strappa its principal exponents. The employed method has allowed to reconstruct the basic type's evolution, reassumed in an abacus in which have been picked those bearing and their synchronic and diachronic variants, dated back thanks to the comparative investigation performed on the known cases of the Italian's peninsular area, in demonstration of the differences between the concepts, about the houses, developed by Northern European's culture and that Mediterranean's culture.

Such analysis is based on the results gotten by the direct examination of the today's buildings, and also on the harvest and the critical interpretation of the historical-documentary and archaeological sources.

The process reconstruction has been conducted, as usual in our School, starting from the contemporary building organisms, that have been submitted to an operation of "strip" of all those superstructures that changed the native order of the type. This has been possible by the comparison between the actual buildings and those of the preceding phases, still conjectured on the forms of the today's buildings and first's 800 cadastral's ones, expressing, also if remotely, the concepts of house developed by the many cultures that populated the Wallonia's territory.

It's important to underline, as premised to the following reconstruction, that the city of Liege can't be taken as representative example of the processes that involved the territorial ambit of the actual Flemish-Belgian area because of the late phase of building installation, compared to those of Roman foundation; some of them had continuity of life up to consolidate some urban systems in the Middle Ages, despite the deep crisis brought with the barbaric populations attacks.

Besides, its peculiar territorial position, nodal point of important forced crossings of Mosa river, determined, at least in Merovingian's and first Carolingian's phases, a possible hybridization of the housing characters types, that cannot be considered belonging to an exclusively autochthonous formation.

The almost total impossibility to find in the today's buildings the traces of the native wooden types, because of the several refurbishing and rebuilding that the city have been submitted for the damages caused by the fires, is one representative and important element of the structural difficulty in the reconstruction the fabric's process. Inauspicious phenomena that Liege's history remembers for them catastrophic effects, but also for the remedies proposed, moreover after new government norm's emanation, that conditioned, sometimes, the characters.

Such typological process, based on a poor and incomplete historical and archaeological documentation for the first phases, finds, beginning from the XV century, a great support, thanks to the existence of meaningful documentary sources.

The main type and the synchronic and diachronic variants of Maison Mytoyenne

The main type in the Northern Europe, dated back in the documents to the XII century, is the Maison Mytoyenne. It's a residential unity, aggregated in a row, constitutively similar to the Italian one, but expressing a different concept of housing space. Entirely wooden realized with "timber frame" structure, known as pan de bois, today it shows, as

Figure 1. Recognition of the building types's modularity based on the nineteenth-century inventory

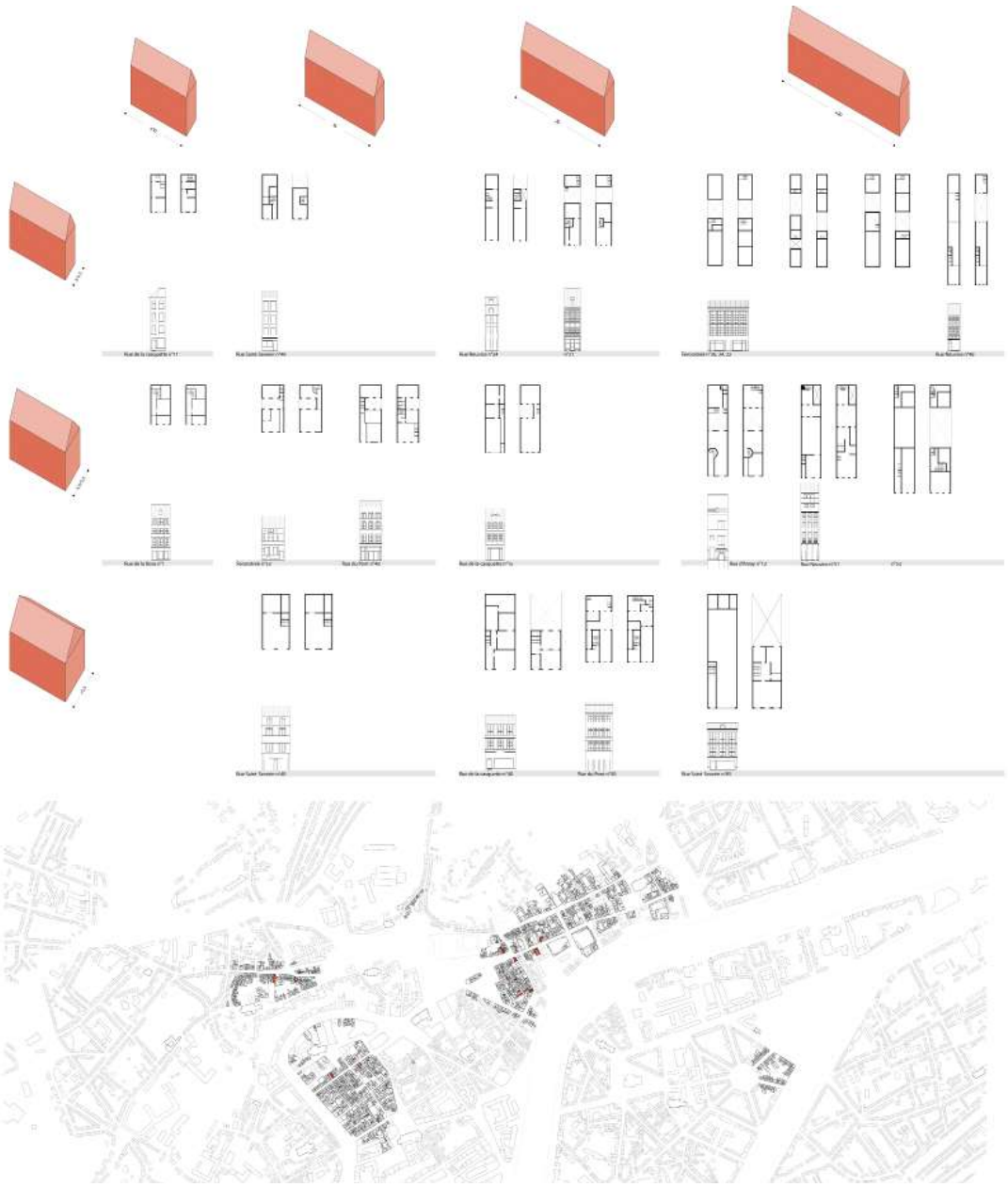
diachronic variant often submitted to the transformation of the house's native concept, a different constructive order and a varied volume from the original one, in fact, further the addiction of other levels, it develops the coverage of the last level with the higher part parallel to the road, often used as part of the residence.

Even if still an hypothesis, the theory that the timber frame building system was diffused from the Roman culture in the Northern Europe's regions seems to be, to the actual state of the studies, the only reasonable thesis, considered that the first samples known at archaeological level are currently those of Ercolano and Pompeii (Geremia, 2014 pg. 93-109).

From the described type remains, in many cases in the today's urban fabric's structure, entirely the initial dimension of the state built lot with a rather small facing street and a variable depth. In fact, seems that the built lots take place on two modules that, in the initial structuring of the inhabited area, are identifiable in: mt 3-3,50 on route and mt 8-12 of depth, with built that it entirely occupies nearly the lot, therefore with a limited inside pertinent area; mt 5-5,50 on route side and mt 10-15 of depth side, with the building that reaches the limit of about mt 10, allowing the back spaces to have good ventilation and lighting from the pertinent area. Sometimes the extension of the pertinent area can be greater, especially along the more ground available, spontaneous or new tracking, routes.

These houses' configuration results therefore bounded by a parceling defined by narrow and long lots with the purpose to organize the greatest number possible of residences along the main route. It's possible to notice the conspicuous presence of laws rules emanated in the cities of the near Germanic and French territory, to show the coincidence among the constructive experience with the progressive maturation of the inhabited space's concept, that regulates constructions, and underlines the target of the organs of government to impose a limit to the building's width, proposing an elevated taxation, not proportional, that increases with the facing street.

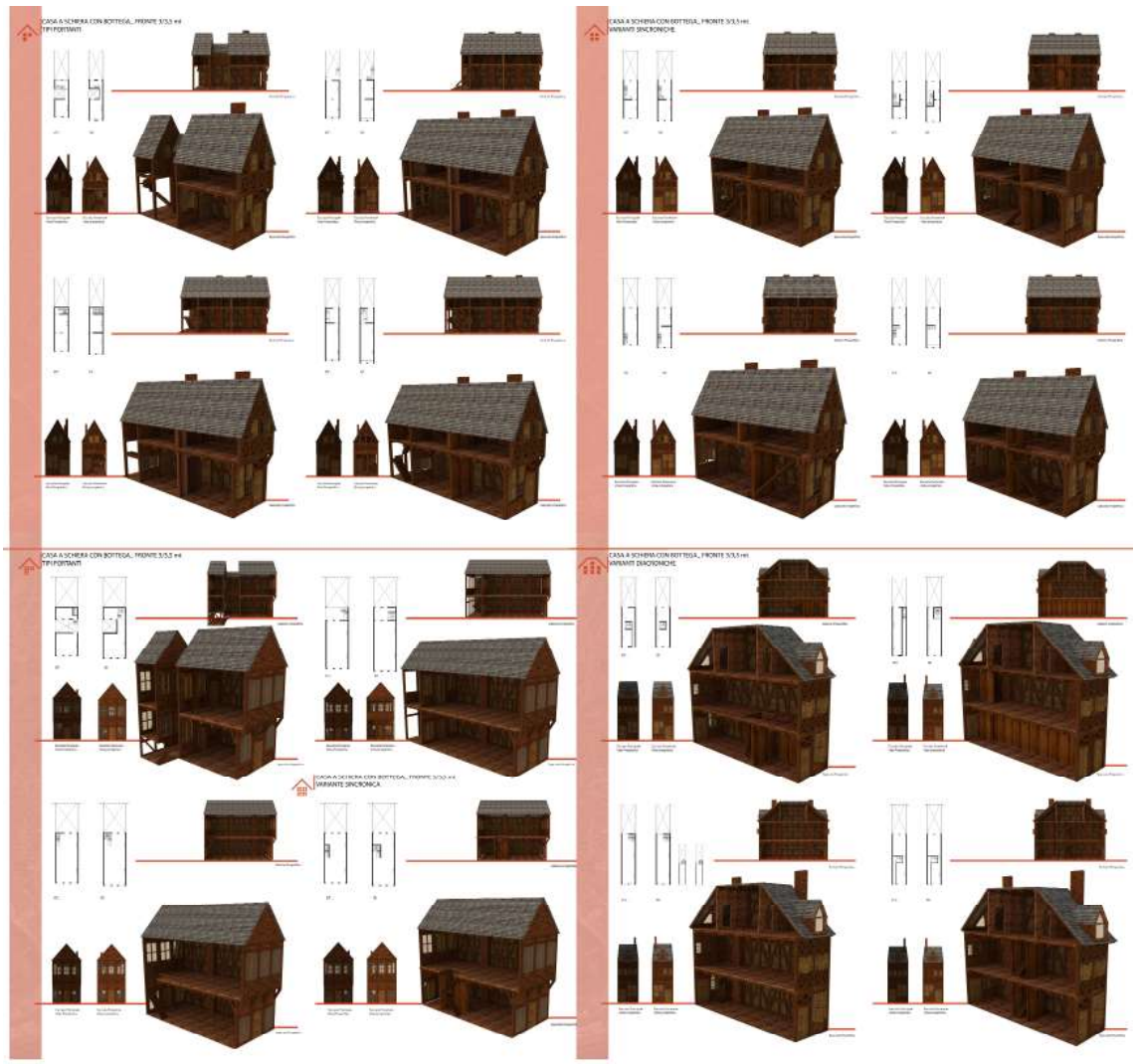
Figure 2. Abacus of the housing types individualized in the today's fabric. Synthesis of the row house's type diachronic trial



In Germany, the govern used to establish a limit width, that had to be rigorously respected and maintained constant, for the built lot; while in France were an annual canon, paid by the citizens according to the width of his own residence. In Liege is only known the figure of the *Voirs Jures du cordeau*, who was a juror employee appointee to check the disputes about the ownerships and contiguity of the built lots.

The difference between the two building types would be able to explain the social distinction in progress in the Northern Europe's medieval society. An increase of the surface appears especially in the buil lots built along the main road axes, or in the nearness to streets or important squares. The different location of a type of buildings, greater than the usual state built lots, testifies the existence of houses belonging to rich merchant's families settled in the city's nodal points. Such variation explains, in the today's types, also the phenomenon of the greater height, that attests, as we will see, the processes of the multi-family type.

Figure 3. Reconstruction of the "Mytoyenne" house typological trial: carrying types, synchronic and diachronic variants



Some researchers recognize in the division of the built lots, originated probably before the XII century, the fields parceling's memory, whose proportions are linked to the nature of the livestock or to the kind of crop to which it was bounded with. Afterwards, the land's subdivision was organized through earth's strips probably gotten by a square's split, in concomitance to the crossed plowing's progressive abandonment. A documentation, that could show the origin and the cause of the subdivision of the lots so consolidated, is missing.

However a reasonable hypothesis about the Romanesque lot's composition, that announces the birth of the mono-family row type just described could be explained, in these writers' opinon, through the process originated by the form of the so called "maison canonial", namely the canons' house, built concomitantly to the realization of the great collegiate churches, in the X century. The built lots identified in the cadastral of nineteenth century, partly persistent still in today's built and assembled in the native walled enclosure, that contained the ecclesiastical ownership, are founded on very large dimensions, around mt 15-20 on the front and mt 20-25 in depth. Such dimensions would make to suppose the existence of courtyard types, perhaps originated from Roman age. Therefore, forms and concept of domestic space that also persist in the following centuries.

A recent study of the historical documents, performed by Demarteau, about the first

district built in Liege during the X century: "l'encloître de Saint-Martin", highlights the relationship among houses of the canons and collegiate churches. Over the limit of the walled ownership, along the preexisting territorial connection route with Maastricht, in the direction of the church of Saint Pierre, some built lots are tracked down in the first years of XIX century's cadastral, and they're attested approximately on a corresponding modularity around the half and a third of the area used by canons. This would bring to conjecture the existence of a building system constituted by residences organized on a halved (around mt 7-8x15 -20) and reduced (around mt 5x15) surface, perhaps because, in the meantime, the houses were growing of a level over, compared to the initial courtyard house. The further expansion behind the ancient cathedral of S. Lambert introduces a lots system in which there are several built lots with mt 5 in the front, with also built lots with the front equal to mt 3 -3.5, gotten these last, with every probability, from the further halving of those ones whose pace was mt 7-8.

The abacus proposed in fig. 1 reconstructs the row house with the mesure of façade of 5 mt, and that of façade more reduced, of the type mytoyenne. Both initially show a room on the front road, separated through a little cloister, from a small open space that contained the staircase. Nevertheless, such order seems not to persist for a long time since the type quickly conquers the whole covered surface occupying also the cloister's space. The two buildings' levels could have had, since its initial constitution, a distinction among the space destined to the job, at the ground floor, and residence to the superior level. The timber frame main structure, with light tamping, would have favored the presence of the overhangs that, besides improving the structure's working, facilitate the protection of the underlying space, where the working and selling activities took place.

The articulation of the type in the following examples seems to show some typical constants, among which: the systematic warpage of the roof like "hut" with the watershed perpendicular to the main road (as is possible to observe in the historical presses of the city); the staircase situated always near to the back part, toward the pertinent area; the unitary use of the available room. Which sometimes, corresponding to the native cellular unity, becomes double use (except the ground floor) inside a same residence distinguishing, with probability, the back space destined to daily activities and connected with the pertinent area, compared to the other one, which holds the sleeping area. Meaningful synchronic variants especially appear in the position of the staircase that can occupy the central part and, more rarely, the frontal cell. Other element that appears with regularity is the fireplace, in the border wall of both the rooms.

The façade's transformation with bricks that followed some norms emanated by the municipality after the fire that devastated the city in the XVI century, meant a mutation that changed the building's legibility and, therefore, the visible features of the types that characterize the urban spaces.

Vitruvius wrote a severe judgment about the risks that the structure involves, especially in the contact with the fire, and about the critical issues produced to the casing by an elastic structure that comes in touch with. But the facility of construction and the easy availability of the material decreed its proper success, especially in all geographical areas that have such resources.

Following that fire, the use of a more resistant material, that also replaced some tamponatures of the timber frame, will promote, in coincidence of a phase of accented urbanism, the gradual growth of the residences that became, in the meanwhile, multifamily houses. Such phenomenon is to connect with the transformation of the wooden staircase that becomes double ramp first, and spiral later, but also with the systematic rotation of the roof that, thanks to the insertion of aero lighting sources drawn in the pitch, accommodates a residence separated from the underlying level.

The progressive building's densification, forced within the boundaries of the XV century, and the start of the prodigious process of industrialization, will change, partly, the urban hierarchies, favoring the expansion along the external lines and the Mosa waterfront, it will bring to a further important phenomenon that will determine, especially in the zones where the pertinent strip is more extended, both the increase of the types in the pertinent area of, and the construction of mono-family independent houses realized on

the fund of the inside free area, occupying the native space intended to the wine cellar-cistern. Such housing types represent meaningful variants of the main ones, due to just a single overlooking, and resulting attainable through an access gotten mediately to the crossing of the ground floor of the house before.

The system of the two residences' settlement mechanism is matched to another interesting casuistry, corresponding to the hierarchy among the aristocratic, or bourgeois, residence, whose formation is already known in the XV century, and the bondage's one. But the relationship among the two building unities postpones, in many cases, another important transformation: the fusion of two or more houses that they renew the type, that becomes, also with a very different meaning from the Italian one, specialized. During the passage of time the phenomenon of the fusion will bring, on one side, to the birth of the in-line house diffused in Europe, from the other, to the formation, already in the XVIII century, of the hôtel paticulier, native type of the French area.

Another building type, that the Belgian literature in subject of urban studies annotates as frequent case in the urban fabric of Liege, up to the second halves the XVI century at least, is the so-called house a "pignon" constituted by housing cells distributed on the main street and unified by an only roof.

Specialized buildings

The analysis at the building organism scale foresees, besides the reconstruction of the process of the basic building, as usual in the studies of typology, the study of the specialized building not addressed to a housing use. Naturally, also those buildings in which the residential component is present but subjected to the one which determines the specialization, are to be considered belonging to this typology.

Specialized religious buildings

Characteristic and exclusive feature of Liege's, at the actual stage of the studies, is the birth of a series of churches, both inside and outside the walls, between the IX and the XI centuries, in connection with the birth of the princedom. We are talking about eight religious buildings classified as "collegiate churches", different from the others and from the parish ones because of the presence of a canon's chapter (or college) of canons, starting to build, from the beginning of XII century, their own residences out of the great ecclesiastical complex in pertinent places that eluding the external jurisdiction. The capitulars assembly gathered the canons' group consisting, generally, of thirty prelates for every Liege's religious chapter.

Observing them inside the urban fabric we notice they didn't establish a connection of organic dependence with the urban space, since they were built along the routes or to its borders, but within an enclosure that makes the relationship with the city "discontinued". In fact, in the actual arrangement, (almost) every building doesn't show a front parvis in relation with the main nave, as it is set, with the mediation of a narthex.

The performed analysis is not limited to the study such religious complexes, but it also considers parish churches, normally located next to those collegiate. These, sometimes born simultaneously, result being smaller, and they born to satisfy different ritual demands.

More exactly, the parish churches can be two types, based on their role: on one hand intended to community of believers supporting the collegiate churches (at service of the canons) or the abbeys (at exclusive use of the monks); on the other they are burned also in absence of a collegiate church, and they are necessary to cover the whole territory for religious reasons.

The eight first collegiate churches: St. Lambert, St. Pierre, St. Martin, St. Jean-en-isle, St. Paul, St. Croix, St. Denis, St. Barthelemy and the abbey of St. Jacques, represent the most important poles and anti-poles that explain the expansion phenomena of the initial nucleus and the mutations in the urban boundary before the conspicuous transformations effected in the XIX century

Built all in ottonian's period (end of the IX century), they show some common char-

Figure 4. Representation of the principal transformation's phases of the base type with "hurdle" structure and constructive detail

acters as, for example, the presence of two opposite choirs, a transept and a cloister to east, recalling therefore the typical characteristics of the ottonian imperial churches in Renania and Saxony. Two towers are often raised at the intersection between the transept and the nave, giving great monumentality to the building.

The Romanesque phase follows the just described one and such collegiate churches increase their dimensions both in plan, through the introduction of side naves divided in spans, and vertically, with the raising that distinguishes various levels constituted by the matroneums and by the clerestories (meaningful prelude to the following phase in which the great Gothic cathedrals were born) and, in some cases, they are equipped with two towers placed at the two sides of the façade, the so-called Westwerk. Further element that is attached, or showily extended, as soon as the community of the canons increases, is the cloister that enhances with more locations and new spaces as, for instance, the chapter rooms for the religious and administrative functions.

Nevertheless, today the most conspicuous and visible traces concern the Gothic transformations: the greatest innovations seem to especially focus in the static system, that sees the naves growing, and in the sculptural apparatus. Also in Liege the Gothic architecture will experiment, in fact, that rich system of constructive expedients common to the whole Northern Europe, as the use of the buttresses, of the rampant arches, of the pillars and of the ribbed vaults that will contribute to consolidate, in the specialized building, the typical language of the elastic-wooden cultural area, constituted by constructive systems, careful, load-bearing and not closing, that defines very permeable and transparent building envelope.

Together with the historical-typological analysis of the single religious specialized

types, an investigation has been conducted at the urban scale, where we have been tried to understand, spatially and temporally, the relationships developed between the collegiate churches and the urban organism, but also among the collegiate churches themselves. This allowed to understand the role of Saint Lambert's cathedral, situated in the center of the city in polar position, and his notable encumbrance, representing the principal building of cult that attests its importance not only in relationship to the community that it represents, but to the whole urban scale. Urban pole resulting subsequently amplified by the construction of the collegiate church of St. Pierre, the first one built near to the cathedral, situated in polar position.

The others collegiate churches at first are placed to the borders of the urban organism, where paths initially determine some urban anti-polarity. They define the limit over which the settlement organism doesn't expand itself.

The growth of the city in the following centuries will bring all these churches to change their role respect to the polarities that have progressively constituted in the urban boundary. The cadastral of nineteenth-century shows a very different situation compared to the one of the earlier centuries: the initial anti-nodality of some collegiate churches is gradually turned into a nodality, following the increase of the fabric around (and beyond) these great religious complexes.

Such urban transformation dynamics, besides supported by the historical-documentary sources, as explained by the apparent anomaly that could be taken observing the position of such churches in the urban structure. In fact, the demeanor typical found in the European installations is to install churches with claustral system churches outside the consolidated built, or outside the walls. Except those buildings that were built to the existing fabric cost, which means for restructuring, as in the case of the palatine chapel of Aachen.

Collegiate churches typological classification

The reading of the type's behavior, based on the configuration structuring axis of the built, especially the naves system, allowed to classify every collegiate church as belonging to the typological current of the nodal specialized housebuilding, whose uniaxial or multiaxial or polarity are recognized (Strappa 1995), but also the relationship that organically ties the church to the cloister.

Based on these parameters the churches of St. Martin, St. Paul, St. Croix, St. Denis, St. Jacques, St. Pierre, St. Barthelemy and St. Lambert are identifiable as nodal specialized housebuilding, in which there is a space, generally the central nave, spatially dominant, statically carried and distributively served; it is, instead, polar specialized housebuilding the one of St. Jean en-isle and St. Andrée, consisting of a series of equivalent axis originated in a pole.

The axis system defining its typological characterization finds with the joining to the claustral plant a complexity that doesn't contaminate the arrangement order of the type, though. The structure hosting the canons' college, subordinated to the church, initially introduces a series of rooms that join along the path. Progressively such structure grows up to shape even more than a cloister.

A further investigation produced within this study is referred to the recognition of the hierarchies proper of one of the most representative buildings of the collegiate churches type: the cathedral of St. Paul. It is at first built out of the consolidated urban fabric, in anti-nodal position, and it consists of a nodal element, the church, to which place side by side a serial aggregation of more base elements around a central common space, the cloister, that becomes, the knot of the serial structure.

Analyzing the generated routes, the most important is the one the connects the church's transept to the canons' private area, consisting of the two hierarchized spaces in the cloister destined to host the Treasure.

From such matrix route, begin the planned building routes, on which are the smaller rooms are disposed forming the structure. A side of the cloister that formed a further route of plant, was englobed in the church during its amplification. A route of connection, finally, closes the series of the routes defining the central space of the cloister.

Palatial special buildings

In the Liege's urban fabric are present also conspicuous examples of specialized serial housebuilding represented by palatial buildings, not all of them intended to the residence.

Among the principals there are, without any doubt about important, also for position in the fabric, the building of the princes-bishops and the hôtel de ville.

The princes-bishops building, dated at the century XI, appear as a Gothic style serial building, although the numerous rehashes that have been stratified during the centuries. Nevertheless many principal characters from the notgerian phase stay unchanged, among them the presence of two courts (at the beginning they were three, but one has been englobed in the building fabric that is set to this building) both consisting of the modular repetition of a span and the overlooking on them of the principal rooms.

The building, with its great plan encumbrance, is classifiable as serial anti-nodal organism, based on the notion of enclosure, because consisting of the serial aggregation of more base cells; aggregation of elements around a court in which the axis of distribution doesn't develop itself on a central common route that distributes equal rooms, but it develops itself on a peripheral axis discoverable in the porch surrounding the first court, and in the galleries that surround the second court.

The other specialized building studied is the hotel de ville, also called la Violette, whose actual configuration goes up to the 1714. It consists of a basic cell, since it is born from the aggregation of three cells modules inside the lot defining the neighborhood. During the years it also suffered several fires and rehashes until occupying the whole lot. It's a symmetrical building, in plan and in front, through an internal double height space, while in façade there are the characteristic ingredients of the eighteenth-century intentionality, among them the rhythmic modular repetition of the openings, the axis of symmetry, the marcapianos, etc..

Particularly meaningful it is the production of the hôtel particulier, private residential complexes that appear in the urban fabric beginning from the XVI century. Meaningful examples are the Hôtel de Selys and the Maison Curtius.

References

Boniver F. (1938), *Les styles des constructions liegeoises* (Fernand Gothier, Liege)
Caniggia G., Maffei G. (1979), *Lettura dell'edilizia di base* (Marsilio Editori, Venezia).
Chouquer G. (2003), *Les forms des paysages medieevaux: declaration d'ouverture de controverse*, Sosson Edition.
Cloquet L. (1907), *Les maisons anciennes en Belgique* (Imprimerie V. van Doosselaere, Gent).
Gobert T. (1929), *Les rues de Liege* (Georges Thone, Liege).
Muratori S. (1963), *Architettura e civiltà in crisi* (C.S.S.U.).
Saumery (1738), *Les delices du pais de Liege* (Everard Kints, Liege).
Strappa G. (1995), *Unità dell'organismo architettonico* (Edizioni Dedalo, Bari).
Strappa G., Ieva, M., Dimatteo M.A. (2003), *La città come organismo. Lettura di Trani alle diverse scale,* (Mario Adda Editore, Bari).
Strappa G. (2014), *L'architettura come processo. Il mondo plastico murario in divenire* (Franco Angeli, Milano).
Occhiuto R. (2014), *Voyage aux rythmes d'une ville-paysage in Guide architecture moderne et contemporaine 1895-2014 Liege,* (Mardaga, Bruxelles).
Maquet J. (2005), L*e patrimoine médiévaL de Wallonie*, (Institut du Patrimoine Wallon, Namur)

The study on evolution of Shanghai urban living morphology based on the change of urban fabric

Fan Ding, Jiang Wu
College of Architecture and Urban Planning, Tongji University, SiPing Road 1239, 200092, Shanghai, P.R.China
Tongji University, SiPing Road 1239, 200092, Shanghai,P.R.China
Keywords: Shanghai, urban living morphology, three typical types, evolution.

Abstract

Different types of urban housing constitute diverse forms of modern urban living, and the study on the spatial morphology characteristics and the evolution process is the most intuitive way of residential morphology study. Residential forms differ at different development stages of the city, while the contributing factors behind are complex and with the times. By analyzing and comparing, the paper tries to achieve the purpose of clarifying the correspondence between the elements and the function of the space with the help of study of trajectory of space revolution. In this paper, the study object are three main living types of shanghai after the establishment of New China, which are separately Li-Long houses, workers' village and modern high-rise community. And the paper tries to analyze the characteristics and evolution course of the living space from the perspectives of city, community and buildings. Through in-depth analysis of three individual cases which represent the three typical residential types separately, the paper tries to summaries the revolution pattern of the urban living morphology of Shanghai city which has the colonial background as well as modern city feature. Thus, based on the evolution of the urban fabric, the paper also tries to explore the relationship between modern and tradition residential space and provide some suggestion for future development of the urban living forms.

Introduction

Aldo Rossi pointed in the book<The Architecture of The City> that: the two most lasting and important parts of the city is 'Residential' and 'Monument'. He defines the 'Residential' as the fundamental factors of the city and the 'Monument' distinguished from the 'Residential' as symbolic places. The residential exist as the most basic part of the city. Although a single house can hardly possess the enduring feature, however when we combine their evolution and their regions into the studies, we find the enduring feature appears. Aldo Rossi believes that, 'Since the residential area plays an important role, the significant changes of the environment they experienced endows the place other than the buildings special characteristic, so we decided on the word of 'Residential area'.' Residential does not come out of air, in fact they are the results of change and adjustment to the actual demand of the Modern City based on the traditional city system.

Investigation on the living space evolution is the most intuitive way to study living morphology. The living morphology varies greatly in different development stages of the city and the Contributing factors behind are complex and with the times. By analyzing and comparing the evolution trajectory we can reach the purpose of clarifying the corresponding relation between the space elements and the structure functions. (Yifan Yu,2010)

Research Scope and Research Objects

Shanghai's living form development after the Opening can be chronologically divided into three stages. The Opening to the 1950s; 1950s to the 1980s; 1980s to the present. Living forms in different periods also changed significantly: - From the Opening to the liberation (1947) to the establishment of People's Republic of China, the living forms are mainly traditional Linong houses and shanty houses, they constitute 89.10% of the whole residential land. - From the New China to the end of 1980s (1958-1988), the land for Workers New Villages increased significantly, while there are some shanty houses left. - After the 1988 Land Use System Reform, commercial residential buildings increased substantially and became the major housing type while the quantity of traditional Linong houses and shanty houses decreased sharply.

The paper selected three Research Objects which are the most important living type in each period, which are separately the traditional Linong houses, Workers New Villages and Modern High-rise Residential Gated Community. And 1-2 specific examples will be studied in each category of the Research Objects in order to support the argument.

Research Structure and Methodology

The paper is mainly based on the physical study dimension. To illustrate the change process of the living morphology, the paper examines the three periods respectively: first give an overview of the period and then use 1-2 specific examples to illustrate the characteristics of living form of this period. Urban fabric studies are included in the example studies, and it utilizes the scale of 1 km × 1 km for each case. This 1 km × 1 km scale is not often used whether in the Urban Planning and Architecture design. It is somehow like the mesa-scale study which is between the Macro-scale and Micro-scale. However it is more effective to understand the definition of commnity, as well as the everyday life of the people living in it and how do people interact with their physical urban environment. The paper selected three 1 km × 1 km line drawings Maps which belongs to three specific cases which are typical and representative of their category.

Case Study

Case 1. Linong Housing

The Linong (also called Li-long or Long-tang) typology is a well-developed urban housing typology at Shanghai in China's modern history which evolved from the 1860s to the

1930s. As a response to the process of rapid urbanization which brought a massive population influx and a shift to urban lifestyles, the Linong typology was invented to accommodate higher density of populations. It combined the character of traditional Chinese residence with a Western building structure.

Linong houses first appeared in the Shanghai's concession and were built by the Real estate businessmen on a large scale. Linong houses are sold or rent to upper and middle Chinese classes who moved to the concession. The contradiction between the limited land and the increasing population became sharp and the land price was expensive. Thus one basic living unit was used repetitively and they were arranged like townhouses and the household walls are shared, and the overall plans are in rows, resulting in a density which is much higher than the traditional residence. Today in central modern Shanghai, we can still see typical urbancapes of homogenous rooftop image (Fig 1). It is the kind of residence has opened up a new era of Chinese urban housing. (Junhua Lv, Peter. G. Rowe, Jie Zhang, 2003)

Spatial structure

The Linong community usually has a clear hierarchy of spaces from public to private with a fishbone-like spatial pattern of lanes. Linong houses are generally 2–3 storey's high and the inside part is mainly for residence and the outside is mainly for commercial use. The main lane is the most important passage in the Linong, leaving on one or two entrances to the residential quarter. Each Linong will only have one such main lane. It is the 'backbone' of the fishbone-like alley network. The sub-lanes make up the rest of the fishbone like network. They extend from the main lane to the front and rear private space of each two rows, where is usually occupied by some activities like washing and cooking. The end of the sub-lanes is usually sealed, so the lanes become a small communal space for residents. The lanes formed safe play spaces for children and daily gathering spaces, enhancing the sense of community.

Community Functions

Neighbourhood-scale functions may also be inserted. An outer layer of units lines the perimeter to form a street wall, lining the street with more commercial and retail functions. As a district, different streets connecting the blocks can have different characters and hierarchy; hence, an urban community is formed.

New Shikumen Linong housing

Around 1919, the "New Shikumen Linong housing" appeared in the west distric of Shanghai Public Concessions in order to adapt to the new housing demand caused by the population increase, family size decrease and the economic level differentiation. The new type of Linong houses are usually built in a large scale and arranged neatly. The houses overall formed a very regular and rhythmic appearance. There are many typical representatives of this new type Linong houses like Jianye , Junyi, Siwen and Yingchun etcs.

The Siwen Linong was constructed in 1916 with an area of 3.21 hectares and 664 residential units, which shows huge-scale of the Shanghai Linong residence construction (Fig.1). The overall arrangement of the houses constitute of the street neighborhood and the inside neighborhood. The external and internal spaces of the Linong have very different characteristics of a public street and private neighbourhood. Peripheral houses are built around the neighborhood and houses are arranged east-west along the DaTian Road and houses inside the neighborhood are townhouses which has a north-south layout. There are 21 rows of houses in the East Siwen with 17-24 units each row, while 18 rows of houses in the West Siwen 16-23 units. The plan of East and West Siwen are basically symmetrical by the main lain and only made some adjustments to the edge of the sites respectively. The main lane is 5 meters, and the buildings bridge both side are Arcades, and the sub-lanes are 4 meters. Houses inside have a typical character of Late Shikumen

Figure 1. Urban Housing Typology1-Linong Housing

Rooftop scene of a Linong area. (Source: Luo Xiaowei and Wu Jiang,1997)

Photos reflect typical living conditions in the late 1980s Linong housing.(Source: Luo Xiaowei and Wu Jiang,1997)

Siwen Linong, built in 1916 (Source: Luo Xiaowei and Wu Jiang,1997)

form, and which along DaTian and XinZha Road have Cantonese-style, and the bottom are occupied by the shops along the street (Fig.1). The strong feeling of neighborhood relations is mainly produced in the sub-lanes. Since the street space are enclosures by the front and rear rows of houses, the continuous real walls of both sides show the strong nature of outdoor public space, it also produces a strong "internal sense" in turn (Fig.1). Unfortunately, the West Siwen Linong has been demolished, while East Siwen Linong is going to be protected in its original site

The common features of urban collective residential are: the residential units are born out of the traditional residentials; constructed in the city on a large scale; collection of multi-families. It inherits from the architectural forms of the traditional residential which already adapted to the local climate and the lifestyle and evolves from it, thus possessing the local characteristics. It is usually developed on a large scale and sold or rent by each household and the traditional family behavior was transformed into a commercial

activity. The size of the dwelling unit shows the trend of miniaturization over time and the Shanghai Linong house is one typical example of this.

Linongs were designed to house the middle class originally. However, with the historical evolution, it gained a slum-like image today and the units were subdivided by different households and the space became overcrowded. Some modern needs such as parking lots cannot be provided. While, the rational urban spatial scales are largely overlooked in today's urban living community design. The city evolves only on the land where the Linong houses are demolished, other than on the basis of them.

Case 2. Socialist Workers' New Villages

In the years between 1949 and 1991, which is the period between the establishment of People's Republic of China and the development of Pudong New District, the Shanghai city mainly functioned as an industry hub for China. With the industry development of Shanghai, besides the construction of many factories and other manufacturing facilities, the government began to build workers' new residential areas which were all named 'New Villages' in the suburb of Shanghai (Fig.2). Working and living quarters were organized very close and the living quarters were funded and built by state-owned work units. (During the socialist period, all forms of business and companies were state owned and termed 'work units'.) The first batch of people elected to live in the 'New Villages' must have a strong political loyalty and made outstanding contributions to the work unit which they belong. Following the socialist ideals, people living the New Villages were provided 'equal' living conditions as far as possible. The people in the same work unit must have the similar backgrounds and it formed a 'forced' homogenization which was completed by a centralized management and supply of the socialist period in China.

Functions

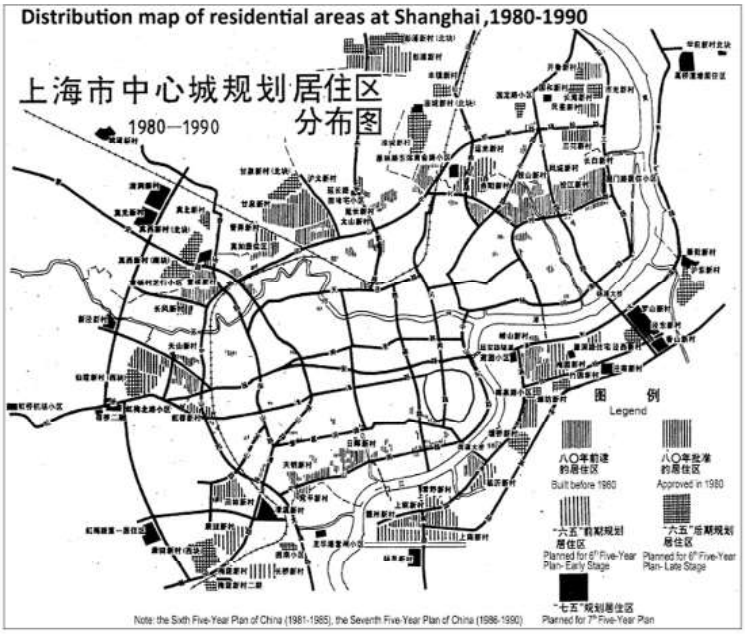
Besides the working and living areas, many other infrastructures are also included in the 'New Village' such as daily provisions, healthcare, elementary education, and recreation which are all run by the state. Thus, a kind of function-mixed urban community was growing based on work and living units. And later with Shanghai's economic growth between 1980s and 1990s, public facilities were added to the New Villages such as activity centers and services like administrative offices, banks, post offices, retail and commercial spaces and public bathrooms. This was part of the plan for the government to improve the living conditions in Shanghai. Compared to the living conditions before the establishment of People's Republic of China, the housing conditions for the working class in the New Villages got huge improvement, and it represent the idea of "working class is the owner of the country".

Spatial structure involution

Between the years from 1950s to 1980s, the type of determinant housing accounted for a dominant part due to economic and ventilation reasons. The houses with the parallel North-South arrangement proved themselves to possess the advantages of construction convenience, space-saving, low cost of pipelines. The houses can receive ample natural sunlight and had rather high green coverage. However the monotonous space is the biggest drawback of this arrangement of housing.

The first generation of socialist housing of the 1950s to the mid-1960s saw rows houses of 2–3 storey buildings. The Caoyang New Village is one typical community of this period. (Fig.2) While during the Cultural Revolution of the mid-1960s to the mid-1970s, there was a lack of resources nationwide, and in the same time the population was booming, which resulted in a huge housing shortage. Additional floors were added to the existing apartment blocks and a more economic type of New Village with lowered standards and compromised material and construction quality were constructed. Consequently, repetitive rows of 4–5 storey housing with shared kitchens and washrooms were built.

Figure 2. Urban Housing Typology2—Socialist Workers' New Villages



A distribution map of residential areas at Shanghai during the 1980s–1990s (Source: Shanghai Municipal Housing Security and Administration Bureau)

Caoyang New Village in the 1950s after its completion (Source: Shanghai Urban Construction Archives)

Early image of Quyang New Village in the 1980s (Source, the Internet)

From the late 1970s to the 1980s, a vast number of new workers' New Villages were constructed, with 6–7 high-rise residential in a higher density. In the late 1980s and the early 1990s, seeking to improve the quality of life, the government experimented with new method of planning and design, breaking the rigid row layout of the villages before. Architectural forms included plate and tower typologies, consisting of both high-rise and

mid-rise, and more attention was paid to designing good quality spaces and greening the built environment, Quyang New Village is a prime example of this.

Caoyang New Village

Caoyang New Village is the first workers' village in the nationwide. Its construction began in 1951, and adopted the form of "neighborhood unit" in some degree. The total area of 94.63 hectares and it is 0.6 Kilometer from the center to the edge and takes 7-8 minutes' walk (Fig.2). Various Public buildings are set up in the center. In order to maintain the situdation of "A certain amount of public buildings and residential economy", the new village has a larger population than the general neighborhood unit (Wang Ding-zeng, 1956). The design of Caoyang Village made a success in the organization of the community internal space and the combination with nature (Fig.2). However, after the Residential District Planning ideology of the Soviet Union was introduced, for some ideological reasons, Caoyang New Village was criticised for the reclection of the capitalist urban planning ideology. At the end of the first five-year plan, the complete planning idea of 'Residential District' of the Soviet Union was introduced and put into practice. Residential District Planning ideology was considered as the embody of Socialist ideology on the Urban Social Structure. As the correspondence to the administrative systems, the residential district is generally consists of three or four hierarchical structures. Take the Caoyang New Village, for example, the entire village is composed by the eight villages, each village plan is divided into three grades, namely the village, the neighborhood and the cluster. The administrative organization is divided into four corresponding grades: street committees (63,400 people), the village committee (8000-1000 people), working area (2000) and groups (300 to 500). Except for the deliberately emphasized ideology and the feature of correspond to the administrative organization system, there is not much differences between the 'Residential District' of the Soviet Union and the 'neighborhood unit'of the western countries, and the 'Residential District' is one level larger than the 'neighborhood unit'. Caoyang New Village was once criticised for the idea of 'neighborhood unit', however it was conceived as a complete residential area in 1975 with 8 residential quarters being built successively.

Quyang New Village

As the Large-scale living district, Quyang New Village was built in the1979. The site was located in the fringe of the urban and it occupied an area of 78.38 hm2 (Fig.2).The whole district was divided into 6 residential quarters and each quarter occupies an area of 10-14.4 hm2 with the population of around 10 thousand each. It was well-equipped with public infrastructures and facilities, which can represent the ideas and practices of Shanghai Residential District Planning and Construction in the 1980s. It had many distinctive features: 1. The layout of the buildings was mainly determinant, with little point buildings inserted into it, which was rarely adopted as a result of waste of land. 2. It was the first residential district which adopted a multi-storey residential high-rise residential mixed arrangement. Except for the large amount of 6-storey multi-storey residential housing, it also arranged the 12-storey point high-rise residential and the 18-storey high-rise residential for the first time (Fig.2). 3. The city's main road and secondary roads passed through the residential district and separated it into 6 quarters (Fig.2). Buildings were arranged in a homogeneous state, and there is no special treatment between the street and community center which is the significant difference with the residential district in 1990s. 4.Roads in the district and the quarters are all arranged evenly, many quarter roads directly open the way to the city roads, the iconic and recognizable character of space is not prominent. Many public infrastructures are uniformly placed in groups in the centers of the quarters, and disjointed with the urban space. The road played an important role as the axis, so we may call arrangement the "Axial determinant", although multi-rise point residential and high-rise residential are embedded.

In the unit design, Quyang New Village broke the monotonous pattern of the past and

made some new attempt. The plan of the high-rise residential tower broke the previous layout of the inside gallery and improved the phenomenon that the indoor ventilation and lighting of different households are interfered with each other. (Zhenyu Li, 2004)

As a rapid settlements building pattern, Workers New Villages appeared all over the world in the same period. They are usually mainly distributed around the suburbs, as well as the concentrated industrial areas of the city. For a quick resettlement of population in the urbanization, the villages usually take the method of prefabrication, unit combination and modulus construction, generally showing a pattern monotonous space organization. However, it is the homogenization of living which solves the living problem of large-scale population, meanwhile, production and living exhibits the open and integration situation in the same area.The construction of Workers New Villages is the main way of the city government's provision of public housings to the citizens, and it is the fundamental policy for the Shanghai government to clean up the shantytowns and improve workers' living conditions. The Shanghai workers New Villages construction got remarkable results during the entire socialism practice period.

The New Villages can be understood as a union of housing ideals and typologies under the modernist and socialist welfare. Following socialist ideals, people across the different New Villages were to be given living conditions that were as 'equal' as possible. Before the large-scale real estate development of the 1990s, these New Villages were considered to be a relatively good living environment, with much better living conditions than the Linong and other historical areas. Sadly, the kind of these neighborhoods and communities ceased to be built after the boom of the real estate market. The housing system reforms afterwards failed to incorporate the valuable experience accumulated in the construction of the New Village typology, preferring a real estate market-led development model instead.

Today, it still houses a large amount of the urban population and is in relatively high density, with conditions that are quite basic but not poor. However, the type of housing has not been given much attention in Shanghai urban research. Although the New Village covers a large area of Shanghai, the basic model is the same. They were designed and constructed by governments or state-owned work units, with certain standards and rules. Although the typologies of this kind of housing are not as rich as modern housing, there is some clear evolution from the 1950s to the mid-1990s, while it ended its evolution suddenly when estate market emerged accompanied by the open door policy.

Case 3. Modern High-rise Residential Gated Community

30 years after the Reform and Opening is the most dramatically changing period in the evolution of Chinese Urban Space, Shanghai also experienced great changes whether in the form of the city or the living style. Modern High-rise Residential Gated Community gradually becomes a important part of the living forms. High-rise residential buildings have developed quickly by the special advantage in saving land and Improving development efficiency. However its shortage is also obvious in the city which has a long history, the construction of high-rise buildings and the protection of historic image becomes the conflict part.

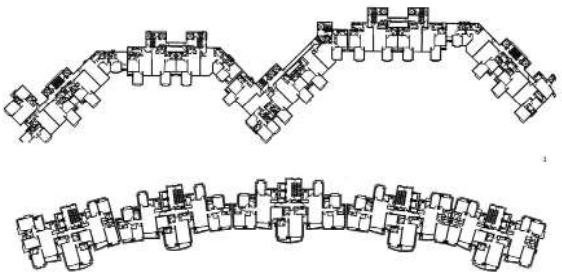
The Urban Renewal can make a success in economy, however in the aspect of city culture, it produced some Negative impact. The diversity in the city center is eliminated and the traditional urban texture is gradually disappear. The living conditions in the city center changes towards to 2 directions: on the one hand the luxury residential communities are interred into the city center as independent units which are usually gated from the outside space, they formed the situation like the "cities in city"; on the other hand, aboriginal people from the center part are forced to move to other regions, living the space occupied by the advanced office buildings and consumer facilities. (LiZhenyu.2004)

With the city turns from "Production hub" to"Consumer Place", the modern living style is gradually marked by the high-rise residential buildings, which has the unreachable central green land and the invisible enclosure. The Living space starts to get separated

Figure 3. Urban Housing Typology3—Modern High-rise Residential Gated Community

Plan and partial view of the Brilliant City (Source, Internet)

Aerial views of Huamu residential area. (Source,Shayongjie,2014)



standard plane of the Brilliant City

from the Urban Space, and it becomes like the Oasis in the city shared by the minority of people. The isolation of living space causes the isolation of the social class, and the vice versa. The city has an explicitly partition, and the living space are defined as independent areas with poor ground floor commercials and community service in and around it. The concept of "Street Neighborhood" is forgotten by people with the disappear of "Street".

The Brilliant City

The location of The Brilliant City is originally the shantytowns in the 20th century Shanghai, which is a classical case of Urban Renewal. It is the landmark of high-rise residential buildings as well as the contradictory complex. The site faces the Suzhou River to the south, and the total planned area is 49.51 hm², the total planned building area is1.7 million m² (Fig.3). Besides the residential area is 1.4 million m², the planned residential population is 3.58 million. The high-grad Planning concept and the high-density lifestyle is the primary contradiction.

The Brilliant City did not follow the traditional grade concept of "Residential district, residential quarters and residential groups", on the contrary, the 33 high-rise residential buildings are organized around 2 theme parks, as the highlight of the space form and the quality of life which is close to the nature (Fig.3). In the original plan, the architect stressed the bottom overhead of the Plate housing, thus the sight and landscape space can be interwoven. However, the huge volume of the high-rise building forms like city walls along the Suzhou river, making the city permeability lowered greatly. As the common resources shared by the citizens , Suzhou River turns to be the "Backyard" of the luxury residential community. The equitable distribution of city space resource is affected either visually or accessibility aspects.

Huamu Luxury Residential Area

Targeted residential of the residential areas are the upper-class population and foreign expatriates. The density of the luxury residential buildings is comparatively lower than the city centre. The housing types often stress variety, with several typologies and designs, such as separated villas, high-class apartments, mid-rise and high-rise buildings. The main character of this case is that a huge commercial complex situated in the middle of the residential area which is named the Thumb Plaza, housing international brands, goods and services. It is very important to the formation and success of new residential districts. It promoted the development of the residential area which has a car-centric living. At the fringes of this commercial core there planed to be some local-level retail, cultural, health and fitness amenities. However, because the residential district was planned and constructed all at once, there was seldom any chance for coordinated the growth over time, so the functions of these retail cores are not well mixed – they are a simple 'standard' mix of retailers and services, so it still feels like a new shopping mall.(Fig.3)

Conclusion: The breakdown of Urban neighborhoods

If we compare the 1 km × 1 km maps of Shanghai traditional Linong community, Workers New Villages and Modern High-rise Residential Gated Community, we can find significant differences in the space textures. The first type of traditional Linong communityshows the character of small land block division, high construction density, dense road network and close fusion with urban space; while the Workers New Villages which are distributed outside the city central area shows distinctive characteristics of Spatial organization of "hierarchy"□the land use scale is large, the denstiy of buildings and nerwork was lowered; and the Modern High-rise Residential Gated Community shows a low construction density, ample green land and open space, obvious introversion of space, a further increase of space between city branch roads.

With the process of urbanization, a large scale of Linong neighborhood was demolished and the surrounding space was occupied by the high-rise residential buildings, causing the damage to the continuity and integrity of urban space. The so-called " City Basin Landscape" caused a dramatic impact for both public aesthetic and the urban form. So it is well worth exploring how to seek common ground between the old and new forms of living morphology in the process of Urban texrure changes.(Fig.4)

M.R.G.Conzen believes that city is the gradually accumulation of physical forms in a long time, it is both complex in the time and space dimensions. So in order to truly understand the city form, First we must clarify the study scale, second, we should split the confusion state into different aspects which are clearly defined ,and analyze them one by one. From the traditional Linong community, Workers New Villages to the Modern High-rise Residential Gated Community, there occurred dramatic changes in the living forms and types. Besides, except for the influence of architecture design and urban planning theory at that time, it was also influenced by the people's demand for housing as well as the worldview, values, cultural concepts, ects. Therefore, when we analyzing the city living forms, we can not overlook the background as well as the different soci-cultural layers and the built environment in relation to housing morphology.

Figure 4. Comparison of three types of Urban Housing Typologies

Comparison of three types of 1 km by 1 km maps (source,shayongjie,2014)

"City Basin" (Photographed by the author in 2014)

Alexander, C. Once said, if the physical world people living in can not maintain the continuity from the traditional world, thus people cannot maintain the relation with the past mentally. In a word, the historic sites is the essence of the area . As to Shanghai, traditional Linong houses before the opening, the Workers New Villages built in the 1950s are all typical urban living forms, and they cannot be erased from the shanghai urban residential development trajectory. In the process of building new urban living space, we should adopt the attitude of respecting and inheriting from the exsiting living space, exploring clues associated with the tradition other than demolition and reconstruction blindly. Only in this way, the whole form of the city and the collective memories of the citizens can be preserved completely and the city can be a lively whole.

References

LuoXiaowei,WuJiang, M. (1997) *Shanghai Nongtang, Shanghai People's Fine Arts Publishing House*.
Spiro Kostof, M. (1993) *The City Shaped: Urban Patterns and Meanings Through History, Bulfinch*.
Spiro Kostof, M. (2005) *The City Assembled: The Elements of Urban Form Through History, Thames & Hudson*.
Yifan Yu, M. (2010) *Morphology Study of urban living* (Dongnan University Press).
Junhua Lv, Peter. G. Rowe, Jie Zhang, M. (2003) *Modern Urban Housing in China* (1840-2000), (Tsinghua University Press).
Xietang Chun, Chun Liu, M. (1998) *Shanghai Residential Building Annals* (Shanghai academy of social sciences press).
Aldo Rossi, M. (2006) *The Architecture of the City,* China Architecture & Building Press.
Serge Salat, M. (2012) *City and Morphology-on sustainable urbanism* (China Architecture & Building Press).

Typo-morphological Assessment of Ludlow

Nevter Zafer Cömert, Şebnem Önal Hoşkara, Naciye Doratlı
Faculty of Architecture, Eastern Mediterranean University, Northern Cyprus
Urban Landscape, Building Typology, Townscape, Conservation, Ludlow
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Abstract

In the field of urban morphology, different scholars had developed different approaches. The pioneering of these approaches are typo-morphological approach of G. Caniggia and the evolutionary approach of MRG Conzen, which is the focus of this paper. However, it is also worth mentioning JWR Whiteheand who has integrated the analysis of changes to the building fabric with the study of the individuals and organizations involved in the various aspects of property development, users, planners and architect. Whitheand (1981), and also Kropf (2009) who has named four distinct approaches being, spatial analytical, configurational, process typological and historico-geographical, for the purpose of determining more explicitly which aspects are included in the different approaches to urban morphology (Kropf, 2009).

Based on the theoretical approaches of the above mentioned scholars, in the scope of this article, architectural and geographical dimension of urban morphology will be discussed on Ludlow, a small market town in the south of Shropshire in England, a few miles east of the Welsh border. The development of Ludlow is structured on successive periods in 12th century, showing a homogenous cultural background. Ludlow is one of the British towns in which MRG Conzen has applied his morphological analysis approach at planning level. Based on his analysis, the town shows a rich morphological character. This article explores urban morphology based on two pioneering morphological studies: Gianfranco Cannigia's theories of typo-morphological understanding, and the evolutionary insights of M.R.G. Conzen and then sets up a typo-morphological basis for Ludlow through an integrated approach, with the belief that such an integrated approach will drive future interventions, design and planning policies towards its conservation and sustainability.

Introduction and Theoretical Background

The study of morphology is focused on the history of variation in form (first use in 1885) and refers to "the study of the physical (or built) fabric of urban form, and the people and processes shaping it", as originally defined by Goethe (1952) and then quoted by Wilkinson and Willough (1962). The study of urban morphology is associated with different views and perspectives. This interdisciplinary characteristic leads to a deeper observation of the origins of urban morphology. Geography and architecture are two major disciplines under which urban morphology has emerged and the research focuses independently either on geographical or architectural dimension of urban morphology.

Although there are three different schools - English school, Italian school and French school, which have been dealing with morphological studies, this paper builds its arguments on two pioneering scholars - MRG Conzen (from the English School) and G.Caniggia (form the Italian School). In this paper it will, firstly be attempted to suggest a hybrid method, which brings Conzen's and G.Caniggia's methods together, as the authors determined that Conzen's method is somehow restricted for understanding the overall morphology of towns. Secondly, this proposed method will be applied to Ludlow in the UK, which has previously been extensively studied and analyzed by MRG Conzen, in order to be able to see the applicability of the proposed method.

The significance of MRG Conzen's and G.Caniggia's Ideas

In morphological studies, MRG Conzen's main contribution was to urban morphogenetics, rather than town planning and he considered maps of settlement types over the whole of region, symbolically showing the complete range of urban and rural settlement forms (Whitehand 1987). He emphasized that a town plan was a combination of three distinct but integral plan elements, which included (a) the streets and their street system, (b) the plots and their plot pattern and (c) the building arrangement within these patterns. He explained the present structure of a town plan by examining its historical development, which he called evolutionary theory (MRG Conzen 1981).

On the other hand, G.Caniggia was interested in how typological processes linked to more general mechanisms of cultural transmission, from generation to generation. G.Caniggia's work focused on the conceptual and political basis of architectural design and composition (G.Caniggia G., Maffeig.L. 2001). He continued to develop his theory in order to understand the dynamics of urban form, shaped by its component types and their evolution, throughout its historical development. He called these dynamics a "typological process" (Levy A. 1997). He introduced the idea of 'archetype', which dealt with the basic type and how this type was transformed to a leading type then other types of development throughout the historical process. He carefully constructed the ways in which buildings come together as cities, as he conceptualized his theories into four levels: (a) buildings, (b) building fabrics, (c) settlements, (d) cities.

Accordingly, the main difference between MRG Conzen and G.Caniggia lies within their methodological approaches: MRG Conzen concentrated on evolutionary method, in which he argued that tracing existing forms back to the underlying formative processes and interpreting them accordingly. According to his understanding, the evolutionary method provides an understanding of the physical development of urban structural elements, resulting from the city's cultural and historical development (factors that strongly influenced its morphological development), which is an objective of his morphological approach. On the other hand, G.Caniggia used the typo-morphological method, which concentrated on the relationship between complementary and reversible moments in historic typological research and stages of design developments (Cataldi, 1997:35). He also worked on the analytical built environment concepts on various scales: reading of building constituents, determining the shape, structure and various uses of buildings, just as readings that can be done on the scale of clusters, towns, and territory. This would have eased the understanding of the conforming rules at the root of the structuring of building fabrics, urban organism and territorial ranges. (G.Caniggia G, Maffei G L., 2001: 10).

MRG Conzen and G.Caniggia applied their methods independently in European settlements. Later MRG Conzen extended his research on Asian cities (MRG Conzen, 2004). However, literature survey reveals that MRG Conzen's and G.Caniggia's methods have never been amalgamated together, as there was a clear cut between geographical (MRG Conzen) and architectural perspectives (G.Caniggia) on urban morphology. Thus, their methodologies were never applied together on any urban area.

Methodology

After the literature survey on Conzenian and Caniggian approaches, a hybrid methodology for longitudinal case studies have been developed in order to analyzed the Ludlow in UK. Some of MRG Conzen's and G.Caniggia's terminology, which might be applicable on different regions, has been interpreted. Based on this methodology, culture, socio-economy and politics are defined as factors that directly affect urban morphology throughout history. Whereas, the elements of morphology are classified under six headings: (i) buildings, (ii) plots, (iii) street, (iv) urban tissue, (v) fringe belt and (vi) townscape. Buildings are evaluated by analyzing the plan typology and façade typology. Plots are studied according to their form and ratio in relation with pertinent character. Streets are analysed to determine to understand the relationship of the buildings and plot series along their pertinent characteristics. Urban tissue examines the urban block according to its character. Fringe belts are analyzed according to inner, middle and outer fringe belt formation. Finally, townscape is outlined by analyzing and tracing the building pattern, land utilization pattern and genetic plan unit together.

Within the limitations of this article, street and urban tissue have been excluded from the explanations although they are part of the complete analysis. However, components of street have been partially discussed as a part of plots.

Introduction to the Case of Ludlow

Ludlow is a small market town in the south of Shropshire, a few miles east of the Welsh border in UK. Ludlow's history dates back to the 11th century with the establishment of the castle at the edge of the River Teme. Thus, the town's beginning is clearly related to the castle as its pre-urban nucleus, which in its original smaller form most likely dates back 1086-1094 (MRG Conzen, 1988, p.263). Its development is based on successive periods in the 12th century. The 13th to 16th centuries are known as the Tudor Elizabethan and Jacobian periods; the 16th to 19th centuries are known as the Georgian and Regency periods; and the 19th to 20th centuries are known as the Late Victorian and Edwardian periods.

The town's population today is approximately 7700, but until the late 18th century, it rarely had more than 2000 inhabitants (Loyd, 1984, p.5). Although the foundation of the town of Ludlow followed and was determined by the building of the castle on the ridge overlooking the River Teme, it is likely to be known by its place names, the layout of its roads, the fact that there were two or three earlier settlements (Faraday, 1991, p.1). This town is important for its marketing activity and thus can be considered as a market town, especially during the medieval era.

After the establishment of urban nuclei, market square is located between the church, castle and Dinham. The Broad Street and Mill Street, which were initially developed as residential streets, were transformed into commercial streets during late medieval era. Later, other residential streets, like as Bell Lane, Crows Street and Old Street, have started to develop in eastern and western parts of the town.

Ludlow presents one of the unique morphological characters with its walls. The interpretation of the town plan of Ludlow has started through the work of MRG Conzen from geographical perspective. Without considering the MRG Conzen's overall contribution to the study of urban morphology there are nevertheless some aspects of his interpretation of the town plan of Ludlow, which require reassessment or additional analysis. MRG Conzen has put an emphasis of the importance of morphological analysis of Ludlow dur-

ing 1975. Basically he focused on the townscape, by analysing land utilization, building pattern and plan unit; and by overlapping the results, he figured out the morphological regions, which helps to develop strategies on the town plan conservation and future planning.

Typo-morphological Characteristics of Ludlow
(I) Building

According to G.Caniggia, buildings can be analyzed from the basic genetic units of building through the complex units of the buildings. Within this context plan typology and façade typology become important components that help to understand the typological process of buildings. In order to understand the plan typology, spatial organization has been taken into consideration on the main proto type of each period. Façade typological analysis will then be applied on the first rank of the town center is based on the MRG Conzen morphological region analysis. Facades were analyzed according to mass and voids relations, material and structure.

Plan Typology:

In *Ludlow*, plan typology can be analyzed under 4 periods which are early medieval, late medieval, pre-modern and modern. While considering plan type of the early medieval era, there were few houses, which survived until today. Castle and its surround named as a first urban nuclei and few houses, church, hospital and town walls are survived until today from that era (Faraday, 1991, p. 89-93).

In *early medieval* era, base type mainly, compose of two rooms parallel to each other. Entrance to the end of a long narrow corridor, a hallway, and the stairs are reached at the end of this corridor. Service spaces like a kitchen or storage has been located at the basement. Usually first floors were similar to the ground floors. The later development of the housing types is based on this typology. Figure 1 shows the leading types, which emerged from the base type. The entrance of a building is located in the middle of arrangement and two rooms or four rooms or integrated rooms take its place either on right or left side of entrance. In some cases, half hexagon extensions on the front façade have been followed. One of the important characteristics of the early medieval houses is the integration of the shops with the buildings. Usually, shops are located on the ground whereas kitchen, living room and study room takes its place on the first floor. Cellar and storage are located on the basement floor. Second floor consist of bedrooms and bathroom. Those types of houses have surrounded the market square in medieval era.

In late medieval time, (Tudor-Elizabeth Period); The most dominant characteristics of building elements different than previous period is fireplaces and chimneys, and staircases featured more prominently. The base type of era shows that kitchen, dining room, living room are lay along the narrow corridor and hall way which give an accessibility to the main entrance. Upper floor rooms are arranged around the hallways. Rests of the types in that period emerged from the base type. On the other hand, some of the buildings, which is accommodate multi use like housing and shopping, have created another base type. In this type, basement floor is used as a cellar, kitchen and storage, where all rooms are located side by side. On the ground floor plan there is a direct entrances to shops. Vertical circulation that reached the upper floor take its place at the rear part of the building or at the end of the corridor or passage way. All of the functions are arranged along the main bone that can be named as passage way or corridor on the ground floor. Leading types have emerged from this type with the addition of rooms along the axis. First floor is arranged around the corridor as well.

Pre-modern time, (Georgian and Regency period) takes its plan typology from the early medieval period, and similarly the long narrow corridor, a hallway, the stairs are located at the end of the corridor. Leading type plans are influenced from the base types. Like medieval plans, some of the parlour has got the half hexagon bay. The first floor typology based on the ground floor base type with narrow long corridor and two rooms on the left side and two rooms on the right side as well as bathroom and auxiliary

functions takes its place on the corridor. Generally other types of plans are generated from the base type. Sometimes rooms' arrangement takes place around the hall where the vertical circulation is also located.

Modern Time is starting with 20th century (Late Victorian and Edwardian period); That era shows similar plan arrangement like previous periods, base type of the buildings were same. There is an entrance patio facing the corridor and all rooms take place along this corridor. Stairs are located near the entrance. There is no relation with the ground floor spaces. At the first floor, all rooms are located around the corridor ways. The leading type of the ground floors or upper floors is the extension of this base type.

The plan typology has been influenced by the early medieval time base type plans. But at the late medieval, it turned into another formation, which would have been a result of the Civil War. The building typologies became larger than the previous ones and families started to live with their relative together. During this period, importance of trade activity has increased. Usually all of the ground floors were used as shops and upper floors were used as living spaces. In pre modern time, plan units were directly influenced by the early medieval period. The entrance faced the long and narrow corridor and at the end of the corridor stair ways is observed. Generally, room arrangement shows similarities with the medieval period base and leading type. In modern time, same style has been continued with small changes, but basically it carries the same typology of previous periods except the dominance of the half hexagon parlour types. In summary except late medieval, all plan types influenced by the early medieval period until today.

Façade Typology

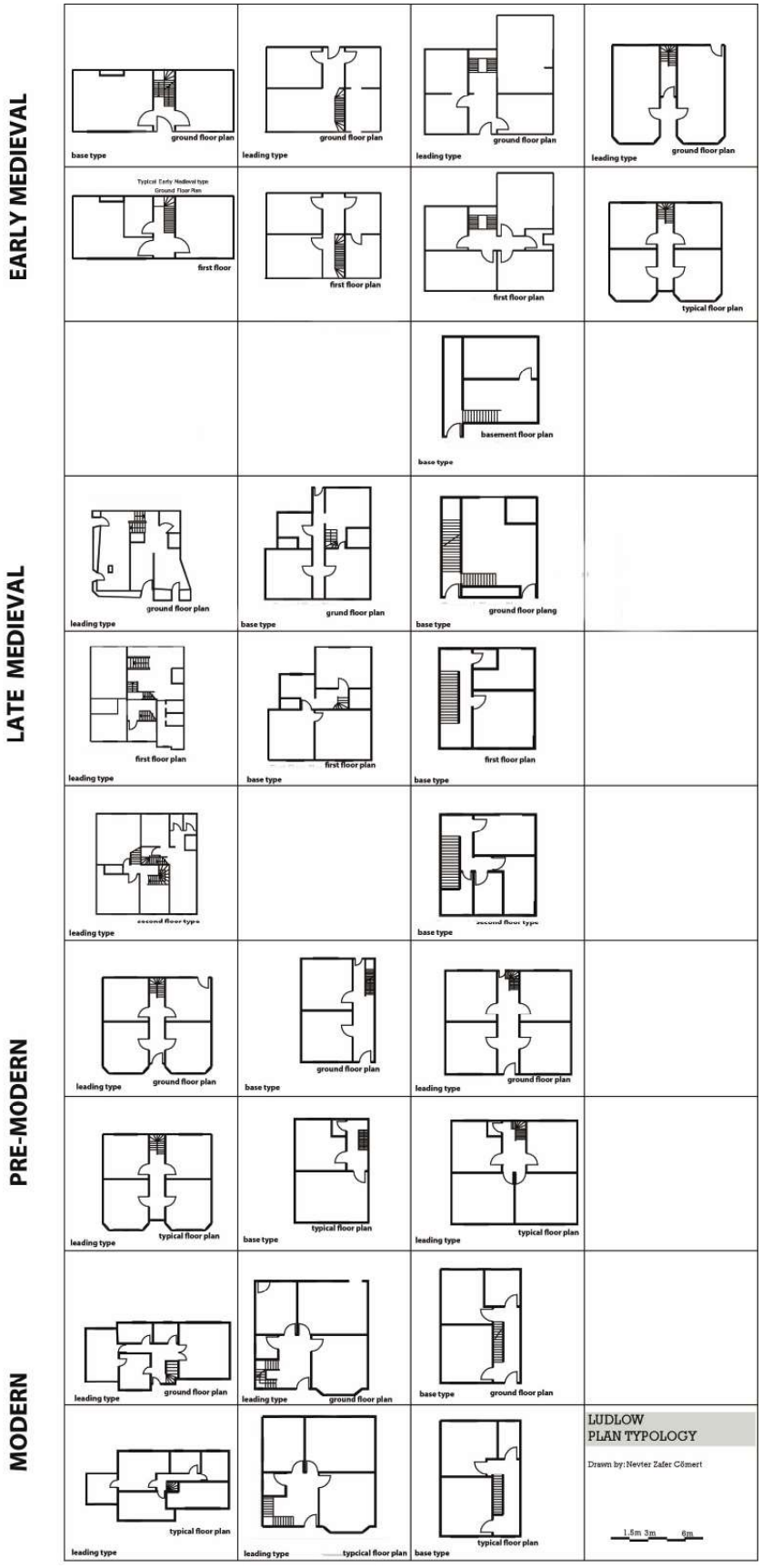
In Ludlow buildings are usually two or three storey. If they are at the town center, shops frontage has been on the ground floor and upper floor used as a house, offices etc. In early medieval period, (Tudor-Elizabeth period), building facades' *materials* are composed of wood and gypsum. Voids (windows)' ratio is approximately 1:1, 1:1.5 and 1:2, solid surface covers much span than the voids on the facades. Black and white balance is one of the significant characteristics of the building. Most ordinary homes in Tudor times were half timbered - they had wooden frames and the spaces in between are filled with small sticks and wet clay called wattle and daub. Usually there are two windows on the surfaces at each floor. If the shops are on the ground floor, houses' entrances are faced on different sides.

Shop entrances and frontages lay along the main street. Wooden linear dark color structure systems add variety to the façade surface. Surfaces covered with wooden supports and gypsum. In addition to these, windows' frames and dividers are made of wood and they create a unity on the façade. Usually doors are fully wooden as well as on the shop entrance door way are the same. Shop frontage frame is wood. *Structure* techniques are wooden load bearing system and stone load bearing system.

In l*ate medieval* period the *mass and void* relations is different than early medieval period. The windows form is turned into rectangular shape instead of square shape. In addition to this, *sash* window style is observed on windows. There is an ornamentation on the top of the window with a row of trapezoid stones which is behaving like a lintel. The window is divided into small square or rectangle pieces. Sometimes half circular windows or doors top/headings have been observed on the façade together with the quoins. Another significant element on the façade is pediments which surrounded the door with stone blocks. This is the element that is observed on the façade and it put emphasis on the period characteristics. Their ratio is 1:2 and windows are top of each other. Their size become larger and they become more dominant element on the façade according to mass and void relations.

Other significant changes on the façade are hexagonal bays. However, they are not efficiently used in those times. Additionally, shops windows' division shows similarity like a house window and their shape is rectangular. Doors shape has changed during this time which is composing of half wooden, half glass surface. Stone ornamentations, wooden window, doorframe, stone decorations are the materials used on façade. The *structure system* of the buildings is stone /brick load bearing system like a previous period.

Figure 1. Building Plan Typology



In Pre- modern times, *mass and void* relations are more or less like a Georgian and Regency period. Although the ratios of the windows are the same, their ornamentation is different. However, façade balance is same as before. In this period sash windows are simpler and their division number is lesser then before. The window lintel and ornamentation is half arc which is one of the important significant changes that is different than the previous periods. Other significant changes on the façade typologies are frequent uses of hexagonal bays. One of the advantages of the hexagonal shop window is to take the view from many ways. In addition to this, the façade ornamentation becomes plainer than before.

The *material* that have been used in this period is stone arch shape window headings, wooden window frames and casements, wooden door for residential uses and half wood half glass material for shop frontage and doors, red brick and white plaster on the surface cover. Generally the structural system is load bearing system but reinforce concrete has been observed on some of the buildings.

In modern times, building *mass and void* relations is more or less like in previous period. Moreover because of the construction technique and structural system windows' ratios have changed. Column and beam system gives an opportunity for larger voids on the surface for that reason sometimes the facades are full of window. Sometimes although the windows ratio is 1:2, they are larger than before where as some of them cover the half surfaces of facades.

Same points have been reflected on the shop frontage as well. In addition to these the *materials* are changed. Some of the window and door frames are wooden some of them are aluminum and some of them are composite materials. The surface material is either red brick cover or plaster. This material change is one of the significant characteristics of that period. When structural system is considered, generally they are skeletal system and some of the buildings still constructed as a stone load bearing system.

(II) Plot

Plots are analyzed according to their establishment and rank of road hierarchy. The findings show that, Mill Street and Broad Street plot character shows similarities. Although they have a narrow and linear character, their size and ratios are different. Although Raven lane is parallel to Mill Street and Broad Street its plot form is not as narrow as the others, where the ratio is approximately 1:3 or 1:2.

The plot formation on Old Street shows differences based on wide and large rectangular form characteristics. Although its ratio is 1:2 the size of the area is larger than plots on Broad Street. Dinham has irregular plot form which cannot be classified in a group. But later development of those units shows differences like Mill Street and Old Street form, which is narrow and long. Bell lane and Brand lane plot form shows some differences than others. Some of the plot form likes wide, large and rectangular form is like others but some of them are L shape forms, which have not seen before.

On the Castle Street and Market Square, 9 types of plot form has been observed. The first types are much like of those on Mill Street and Broad Street, narrow and deep. Other type is like a square form which ratio nearly 1:1. Other type is L shape form like Bell Lane but its area is three times bigger than Bell Lane plot form. In addition to this, the plots which is in the Market Square, are carrying the same form, square or small rectangular form. However their area shows small differences than each other. On the other hand, other plot formation is seen next to the castle which is irregular form like Dinham unit.

Another typology is large and rectangular types, which size is larger than others and its ratio is around 1:2. Crow street plots are large and wide which ratio is 1:2 on one hand. The other typology is deep and narrow and its size is twice larger than the other narrow and deep plots. The King Street plot typology is starts to smaller rectangular plot to larger and rectangular plot that shows the gradual growth throughout the crow street plot typology.

Based on the typological analysis of the plot formation General layout of the plot typology can be classified under five categories:

- Rectangular shape - narrow and deep formation – ratio ≥ 1:5

Figure 2. Buildig Façade Typology

1330

- Rectangular shape- wide and large formation- ratio ≤1:4
- Square shape-equal formation- ratio 1:2/ 1:1
- L shape- large and wide formation- ratio 4:2
- Irregular form

(III) Fringe Belt

The fringe belt characteristic of Ludlow shows the typical formation of medieval town belts. The Castel is the first settled area with its fortifications, and it is surrounded by an open land (green area) with outer walls which named as an inner fringe belt Outer Fringe belt is defined with town walls and the area between inner fringe belt and outer fringe belt has the housing units which show homogenous character with their plots. But the buildings from the outer part of the outer fringe belt shows some differences from each other.

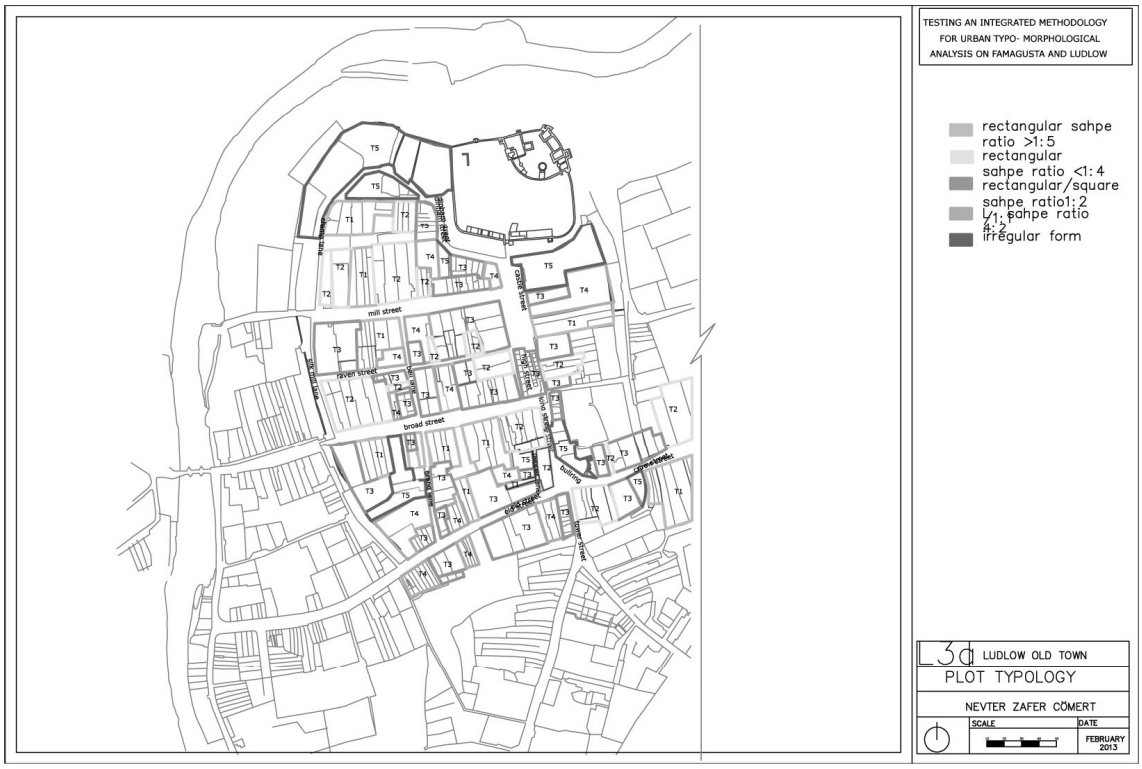
(IV) Townscape

Townscape is analyzed through the components under three headings which are land utilization, building pattern and plan unit type. Intersection of three components gives the townscape formation of the historical towns. MRG Conzen applied townscape analysis on Ludlow and he published his work in 1988 with the title of '*Morphogenesis, morphological regions and secular human agency in the historic townscape as exemplified by Ludlow*'.

Land Utilization

MRG Conzen's analysis of Ludlow land utilization shows that, there is few open spaces, which surround the Castle and religious spaces. Public and community functions are distributed through the whole town randomly. Similarly, industrial premises compose of

Figure 3. Building Plot Typology



builders' yards and warehouses where are distributed randomly in the town. Shops, business and professional premises with or without residence are located along the Market Square, King Street and High Street. Some of them took place among the houses but they are not dominating the surrounding. Shops, business and professional premises show an axial development at the center of the town. MRG Conzen named this area as a traditional core of town (MRG Conzen, 1969; 234). Transportation premises have taken its place at the fringe of the town.

Building Pattern

MRG Conzen analyzed the building pattern under 6 periods. Based on this classification there are few medieval houses survived until today, which are located along the High Street and Bull Ring. Other few houses are located close to the town walls along the Mill Street and Broad Street. There is some Tudor Elizabeth and Jacobian Period houses, which have been located close to the medieval houses and on the market square.

Additionally, most common buildings belong to the Georgian and Regency period. They are located along the main roads which are King Street, Market Square, Mill Street, Old Street, Crowe Street and Broad Street whereas Late Victorian houses were built on the empty plots like an infill. Some of them were built on the outer part of the walls. Modern buildings has been built up on the Bell Lanes and others are built behind the traditional houses in the mid of the blocks, which are not directly seen from the road.

Genetic Plan Unit

MRG Conzen defines 6 types of genetic plan unit formation. The first plan unit has appeared with the castle, which is called pre urban nucleus named as first genetic plan unit. The second plan unit has been followed in this period around the castle extension in late 12th Century. In medieval borough time, Dinham Unit has been followed the previous units on the west part of the castle. Later development has been started from the opposite side of the Dinham Unit, which called Christ Croft development.

Broad Street-Mill Street unit is another plan unit type with deep burgage characteristics. Church units' plan unit in the town shows some different characteristics in that time with different size and formation. The High Street Unit is another significant unit with marketing functions with deep narrow burgage. In addition to these, in the later 12th century, plan unit formation is deep-burgage ribbons with the mixture of different building types and mixture of shopping function. On the other hand, Old Street and some parts of the Crow Street show and other different formation.

Until here the streets are organic and not regular but, Mill Street and Broad Street shows regular street organization with its medium size plots and regular housing organization. This plan unit is different than others because there are the occupational lanes which give access to the streets and their width and depth are lesser than the main streets. Because of the fabric production in Ludlow, Bell Lane is unit developed to give access to the production with its wide-burgage cycle.

Conclusion

This study, having explored urban morphology based on G.Caniggia's theories of typo-morphological understanding and MRG Conzen's evolutionary insight, has presented a new methodological approach to morphology: Then, this new methodology has been applied onto the town of Ludlow in the UK.

By the end of the study it can be suggested that, by utilising the typo-morphological basis presented in this paper, a strategic plan for conservation and sustainability of Ludlow could be developed, through the participation of all stakeholders. It can also be suggested that typo-morphological characteristics of Ludlow should lead future interventions, design and planning policies for the town.

From a more general perspective, at the end of this study, it is also hoped that the proposed analysis method on urban form shaped by typo-morphological approaches will help designers, planners, cultural geographers and urban morphologists to find better solutions while they are designing, analyzing, planning and/or conserving existing—historic and traditional—urban areas in town and cities.

References

Caniggia G, Maffei G. (2001) *Interpreing Basic building Architectural composition and building typology* (Alinea editrice, Firenze, Italy).

Conzen M.P(Ed),(2004) *Thinking about urban form* (Peter Lang, Germany).

Comert N.Z., (2013) *Testing an Integrated Methodolgy For Urban Typo-Morphological Analysis on Famagusta and Ludlow*, Unpublished Phd. Thesis, EMU.

MRG Conzen M.R,G, (1981), The plan analysis of an English city centre, in JWR Whitehand(ed) *The Urban Landscape:Historical Development and Management*, (Academic Press, London) 25-55.

MRG Conzen M.R.G, 1988, Morphogenesis, morphological regions and secular human agency in the historic townscape as exemplified by Ludlow, in Denecke,D. and Shaw,G. (eds) *urban historical geography* (Cambridge Uni. Press, Cambridge) 255-261.

Faraday M., 1991, *Ludlow 1085-1660: A Social, Economic and Plitical History* (Phillimore&Co. Ltd. Sussex, UK).

Cataldi, G. and Maffei, G.L. andVaccaro, P. (1997) *The typomorphological approach of G. Canniggia and his school thought, Urban morphology, V:1* Birmingham Heron press, ,pp:52-56

Levy, A. (1997) *The typomorphological approach of G. Canniggia and his school thought, Urban morphology, V:1* (Heron press, Birmingham UK) 52-56.

Lloyd D.& Klein P., *1984, Ludlow: Historic Town in Words and Pictures* (Phillimore&Co.Ltd. Sussex, UK).

Whitehand, JWR. (1987) *The changing case of cities: A study of Development Cycles and Urban Form* (Basil Blackwell, UK).

The urban forms of contemporary Rome

Massimo Zammerini
Facoltà di Architettura, Sapienza Università di Roma, Italy
Keywords: Rome, Courtyard, Modern, Open

Abstract

Rome is the one of the most scenographic cities in Europe and one with the highest number of historical stratifications. To understand contemporary Rome in its outward sprawl, however, means to understand an uncontrolled relationship between order and chaos. Since the postwar period the loss of compactness in urban planning has been occurring with chronological progression resulting in the break-up of its own structuring principle in the city area, which should be understood more as a surrender to rampant overbuilding rather than a search for new models. In the latest years the badly planned city outskirts with their equal-height residential buildings showing no identifiable connection with the "territory" at all represent a considerable change of the urban settlement principle characteristic of the Italian landscape where the idea of beauty was given by the contrast between a building and its natural surroundings resulting in a mutual, organic celebration of both. After the Rome of Pope Sixtus V, the complexity of the Baroque style, the 19the century geometrical precision of the urban fabric, the "suprematist" experiment of E42, the myth of the Mediterranean and of Neorealism, what will we have to do in order to build a new idea of a city anchored to the aspirations of a globally changed society? My conference paper proposal stems from this question as it intends to critically analyze the current meaning of the relationship between the urban and architectural aggregations of Roman monumental features and the urban sprawl as well as modern and contemporary interventions on the international stage which are compatibile with the stratification principle and with the theme of "scale jumping" which Rome shows in its consolidated image.

Introduction

The perception of Rome's most striking characteristics within the European context shows problematic issues as well as elements of extraordinary importance, these latter forming a fertile heritage which will remain available throughout the future. If, on one hand, it is up to historians and restorers to engage in the study, preservation and accessibility of the artistic and architectonic heritage, on the other hand, it is the designer's task to become sensitive to the idea of historical continuity. This latter does not involve, however, a repetitive revival of pre-existing forms but, rather, a deeper awareness that what is "new" is an integral part of a vast time-stratified network of connections (Giovannoni, 1931). Since the 1930's Rome has expressed the idea of an urban planning designed, with its squares and streets (Sitte, 1889), according to a plan which has been developing since the Renaissance and which across the centuries has ranged from the complex spaces of 16th and 17th century Baroque, to the 19th century idea of a town characterized by a strictly geometrical grid-pattern, a re-thinking of historicized models and types which characterize the first years of the 20th century, down to the architecture of the Fascist period. Each of these "massive historical periods" (Levi-Strauss, 1962) develops its own construction process of the urban space which then become reference models not just as long-lasting motifs to be exploited in the years to come but as models which can be adapted to other contexts.

Methodology

The "Rome Model" suggests urban systems at the same time original and universal, some of which stand out and have been handed down to us in a larger size: the medieval urban fabric grafted onto ancient pre-existing structures, the Rome of Julius II and Sixtus V which introduces the structural/spatial element of the "visual axis", the Renaissance model street/square/background/building as in Palazzo Farnese, the many scenographic Baroque spaces, of which Bernini is the most memorable example, though no longer significant after the demolition of "Spina di Borgo" (figure 1), St.Peter's Square and its connection with the channel of Borgo Nuovo (Birindelli, 1981) and the complex system of pre-existing structures (Benevolo, 1990). In the areas of 19th century Rome one can still feel a sense of continuity with the historical city, especially in the compact volumes of the buildings, in the continuity of the urban scene and in the layout, in the proportions and the decorations of the windows, which, however, progressively loses its scenographic character that for three centuries connoted the multi-faceted Roman landscape and turns away from the typical exhuberance of mediterrenean landscapes, which, after all, is not an explicitely characteristic of Rome. Rome's 19th century architecture represents a quite delicate turning point, marking the passage to the industrialized city with its new functional requirements caused by urbanization (Insolera, 1962). This is when the Roman skyline starts to change and whole areas start being built in which the façade cornice of a building is perfectly aligned with the ones of its surrounding buildings, as in the areas of Prati or Esquilino areas, where apart from some roof-terraces or corner turrets typical of more prestigious buildings, they give rise to an essentially monotonous skyline. The city surrounded by hills, where, as Ludovico Quaroni remembers (Quaroni, 1969), the view of the pinetrees towers over the tops of the buildings, still elegantly offers itself as a model which is largely widespread in the central European capital cities. Rome's 19th century architecture shows the persistence of a neoclassical imitation of the antique, which is no longer so strict but becomes quite eclectic opening itself to contaminations of different styles. A similar traditional tendency can be observed in furniture, where a copy of the original model is used to transfer certain stylistic elements on any type of furniture characterized by a particular style. From the early 20th century it can be said that " creating is narrating" (Sonnet, 2014) in the sense that by renewing itself the whole historical heritage does not cancel but, rather, reinforces in the Eternal City the idea of the antique as the timeless modern, a concept that later on the Modernist cultural movement will assume as one of the basic tenets of its vision of Rome. Historical plans play an important role in

Figure 1. Ideal reconstruction of "Borgo Nuovo" in Rome, Massimo Zammerini 1991, thesis in architecture

this idea of creating as narrating and they prove especially useful in tracing successive intentions and visions. Rome plans build a thematic narrative. Thus, we have plans by Bufalini dating back to the 16th century showing the Borghi/Trastevere axis (1559), those by Lavinio Cruyl, going back to the 16th century (1665), which show geometric abstraction in the relation between built and natural environments, while others by Matteo Gregorio De Rossi (1668) show the architectural continuum by defining just the block perimeter. We have the fanciful and intentional proportional changes of Tempesta at the turn of the 18th century (1693), the continuity between the layout of the streets and "internal" spaces, like churches and yards, treated as external spaces by Nolli (1748) and then in the 19th century the geometrization of the natural environment in Pietro Ruga (1824) or the shaded drawings of height variations on geometrizied green areas by Angelo Uggeri (1826).The historical heritage of Rome plans will then be the object of scientific reconsideration carried out by Saverio Muratori at the Centro Studi di Storia Urbanistica (Centre for Urban History Studies).

Figure 2. New buildings and rural complex in the Roman countryside

Forming process

A compact idea of urban form persists in Italy until the 1940's. As regards the idea of the city itself, all over the world, the hectic cultural life of the 1920's and the concepts of the avant-garde movements partially destroyed the very idea of historical continuity . The industrial revolution had already caused irreversible changes. Architecture undergoes profound changes from the early 20th century also because of the spread of new building technologies and the large-scale use of reinforced concrete. The sweeping passage from the building technique of the load-bearing wall to the reinforced-concrete or steel frame and the possibility to easily realize these structures have profoundly transformed the most visible architectural element, that of the façade, which more than others is able to secure a fairly broad consensus and which visually connotes the whole image of the city. In Rome, after the war events had ended the period of the Fascist architecture where the theme of the "new" was expressed by means of a wide range of languages including historicism, the creation of a "Littorio" style (Zammerini, 2002) and Modernism linked to Rationalism (Ciucci, 1989), the rapid transformation from "old" to new", after the "damnation memoriae", takes place in the total absence of any models and without control. Nowadays the poor quality of constructions has led to a perception of the "new" as "ugly" in opposition to the idea of beauty linked to what is antique. This phenomenon has wasted all the efforts made in the first half of the 20th century by the research projects of the avant-gardes and by the different Modernist movements in the country.

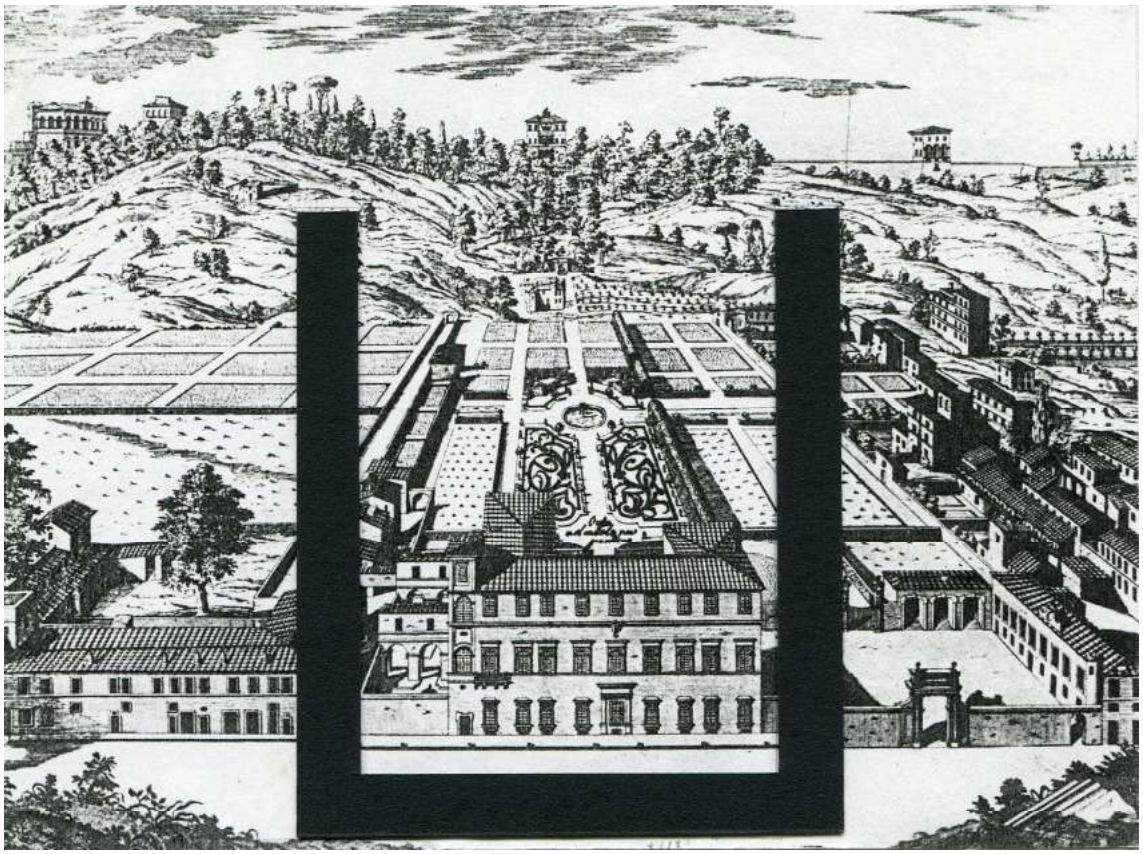
In the reconstruction period Italy missed the great opportunity, given its inability to critically approach the recent past separating architecture from politics while avoiding censorship, to re-think an architecture which had been imposed form above rather than shared and which, however, contains some not fully investigated and obscure aspects. Following the traumatic experience of the Nazi Holocaust, the same concept of rationality is seriously called into question and, as Peter Eisenmann remembers (Falzea, 1993), the western world still hasn't come to terms with the tragedy of the II World War. After

the war, the same great protagonists of this season often choose to live in a condition of seclusion and profound mistrust.

These are the years when the E42 area, that is EUR, is completed. Our analysis of the urban forms of contemporary Rome starts from here, from one of the most difficult cases in our history, which was to create a "second Rome" with multiple objectives and an encyclopedic vocation, which can today be seen in the nearby areas, where well-known spatial and architectural themes originally coexist, and which, though rooted once again in the Roman myth, opens itself to different contaminations. The plan of the area, designed by a team coordinated by Marcello Piacentini and completed by him, with the spaces of the "white city" commissioned to the best architects of the time, shows an extremely complex intention, that is, a new idea of mediterrenean city , monumental and stretching out toward the sea through an "architectural" artery, practically a straight axis rhythmically and continuously dotted by the large crowns of pine-trees, today the Via Cristoforo Colombo. One can enter and leave EUR northward and southward through two "urban doors" which from the project phase to their realization underwent many transformations until after the war when they were turned into the two twin buildings designed by Moretti and the "Palazzo dello Sport" designed by Nervi. Both of them are very clear solutions, quite respectful of the original axis plan made by Piacentini and yet quite different in their architectural expression, which belongs to the following period, and can be considered the last two interventions which give evidence of the fact that it is possible to insert new elements with full awareness and respect of the pre-existing urban layout. This latter was quite peculiar as it was founded on the Roman east-west (cardi) and north-south (decumani) street system even though already looking at the outcomes of the research carried out in Europe by the avantguarde movements and by studies in modern city planning. The transverse axes, so called "decumani", with on one end the monumental Palazzo dei Ricevimenti and Palazzo dei Congressi and on the other end the "Colosseo Quadrato" (Square Colosseum) and the second axis of Viale Europa from the Church of Sts Peter and Paul and the Palazzo degli Archivi together with secondary axes give us, when seen from above, an unusual image hovering between an "architecton" by Malevic and the discovered fragments of a Roman city, all in all characterized by the search for an archaic dimension (Muntoni, 2014). Beyond any possible and necessarily hypothetical interpretation of a project which is still partially incomplete, as regards the themes of the urban forms the EUR area is analyzed from a different perspective in today's debate on contemporary Rome. Though largely refused by the Roman citizens for its metaphysical character which discourages any possible identification, still it gives precious indications among which there are some urban planning solutions which rest on an ancient idea, typical of planned cities, of a city that is "well-rooted" in the earth thanks to a marked use of geometrical forms which by contrast gives more emphasis to natural heights.

The following interventions, in which no trace can be found of this particular experience, from the 1950's to the more recent suburban areas, show quite clearly at least four essential problematic issues: the design of the urban layout, the relationships between elevation and soil, the choices of different types of forms and the skyline. The semi-suburban areas located around the ring just outside the historical centre like Monteverde Nuovo, Aurelio, Balduina, Trionfale, Cassia, Talenti, and the large sprawling areas along the ancient consular roads like Casilino, Prenestino,Tuscolano, Appio and in part also Laurentino and Marconi, the former containing small block of flats and the latter containing intensive buildings and thus still inspired by an idea of consolidated city, are characterized by a substantial loss of all those identifying features which for centuries have gradually overlapped in a process of continuous transformation. The architecture of the city, to paraphrase the text by Aldo Rossi (Rossi, 1966), no longer holds or reproduce itself, it does not stratify but generates unprecedented forms. The blocks are built in random order, they do not run parallel to the street and the streets themselves lose their unitary character. The house and the street are separated and become two extraneous elements. This marks the end of the relationship between architecture and city planning, the terrible crime committed in the name of a vulgar idea of unrestrained liberalism which

Figure 3. Design interpretation of anonymous of the late 600's with views of the gardens of Palazzo Corsini, Massimo Zammerini 1995



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has its triumph in the period of the economic boom. Even the shape of these blocks, with the exception of a very small number of them designed by very clever architects (Rossi, 1984), is unusual: bond facings, exposed concrete slabs, small cantilever balconies, wobbly and crooked –looking parapets of unknown origin, recessed attics created "according to the rules of procedure" and very often "artful" asbestos – covered French roofs, most of which are turned into penthouses. In the meantime one gets used to separating the word building from the word architecture, paving the way to rampant overbuilding which as a matter of fact is present in every Italian city, disfiguring the harmony and the appearance of the landscape which so far has attracted artists from all over the world who for this very reason have set out on their "Italian journey". Only urban social housing is able to escape this waste. Italian Neoroealist films have used these houses as the ideal background to represent those moods, tragedies and explosions of authentic lightheartedness narrated by De Sica, Visconti, Rossellini and other great figures of this rising brand new seventh art, the many working-class districts, from Trullo to the more recent Quaroni's Tiburtino. They still represent the idea of a city characterized by homogeneous, sometimes even reassuring areas, fully immersed in the neatness of the new and modern buildings, a well-organized, safe city, in short a very simple, compassionate environment, well - designed even in its modest but dignified - looking small gates.

The new suburban areas, instead, are created to make the maximum profit by constructors who do not hesitate to exploit the permitted maximum height (figure 2), proposing always the same type of multi-storey buildings, a featureless lay-out showing no urban fabric and lots of car roundabouts. We are worlds away from the idea of a morphological relationship open to processes of slow adaptation to new social, functional and technological needs (Caniggia, Maffei, 1984). This seems highly paradoxical in our

contemporary times which are indeed times of change. We should just think of the idea of flexibility required for the spatial distribution of apartments where, mainly thanks to the Internet, people often work from home , or of the crisis of the "stable" family unit, of the opportunity for different generations, or races, to share the same living space, creating new, once unimaginable, models of coexistence. This calls for a historical breakthrough, which has only just started and which forces architects and town planners to experiment with new typo/morphological aggregations in order to develop various models of urban growth. By studying the countries which were the first to face the idea of an organized and peaceful multiracial city, I would like to focus on the Anglo- Saxon case. It is widely known that in the 1960's and 70's Italian architecture looked with great interest at English typo/morphological experiments, like the Barbican, which proposed urban scale, mostly dwelling units equipped with essential services and in some cases also with some smaller buildings to host small museums, libraries, etc., characterized by a mixture of sizes and types of residential buildings to satisfy a variety of demand. Those kind of units suggested the idea of a village with clearly marked boundaries but still accessible from the outside, set in both well-serviced and well-connected areas of urban expansion and within the consolidated city. These experiments were modern remakes of the Anglo-Saxon crescent the first instance of which is the Royal Crescent realized in 1767 in the thermal city of Bath by John Wood Jr. This model, which also inspired Bruno Taut's "Horseshoe Estate"and French post-modern architecture, starting from Bofille's "Echelles du Baroque" in Paris, brings together the idea of the serial repetition of the terraced house and that of the multi-storey building, and thus of the detached house, through a unitary and strongly self-defining urban design. If the British landscape is characterized by an ideal of settlement based on consolidated building types and urban models which can give it a certain uniformity or by models inspired by a kind of sublimation in the relationship between architecture, art and nature as in Robert Adam's Kenwood House in Hampstead (De Seta, 1986), traditionally the Italian landscape offers a different kind of variety in the scenographic relationship between the morphology of the natural places and the architectural "solution". The Roman countryside can still teach us an important lesson: the dislocation of small agricultural undertakings characterized by the idea of a central empty unit surrounded by housing, work and animal farming units brings us back to an ideal that resists the state of decay which, unfortunately, often characterizes them. Far from evoking the kind of fairy-tale bucolic atmosphere of the "Mulino Bianco" (literally "White Mill"), the new horizons evoked by strategies for sustainability seem to invoke again a theoretical reflection on man-made environment. Besides, the incapacity to plan on a large scale should lead to a policy of accurate re-activation of existing realities re-establishing a connection with that kind of reality. The new urban areas should then be based on planimetric layouts following the Roman typo/morphological structure paying special attention to one the most popular models starting from the Baroque period, that of the courtyard enclosed on three sides with the fourth one that gives out onto the natural landscape (figure 3, 4). This variation of the cloister model which can be realized in medium-scale for housing developments as well as for urban systems so linked to form complex urban fabrics has been studied and sometimes remarkably re-interpreted in our modern culture even though charged with symbolical meanings. This was done, for instance, by Louis Kahn, with the design of a cloister structure for the Dominican Sisters' Convent in Pennsylvania in 1965 or with the idea of a metaphysical square for the Salk Institute for Biological Studies in San Diego in 1959. In Finland, in the town hall of Saynatsalo in 1951 Alvar Alto built a little jewel, a kind of building with a village-like structure following the courtyard arrangement characterized by a stronger human dimension.

Conclusion

Apart from these examples, today the ideal of an urban-scale architecture whose forms well express a system of relationships with the surrounding environment and which at the same time is able to impose itself with its own scale, seems to be absolutely necessary. In order to get this idea more widely shared, starting from the very training pro-

grams and especially from Engineering and Architecture study programs, it is necessary to encourage the study of History, since without a knowledge of this any effort will remain fruitless.

References

Caniggia, G., Maffei G. (1984) *Composizione Architettonica e Tipologia Edilizia. Il progetto nell'edilizia di base* (Venezia).
Benevolo, L. (1990) "La percezione dell'invisibile: piazza S. Pietro del Bernini", in: "Casabella", n. 572.
Birindelli, M. (1981) *Piazza San Pietro* (Editori Laterza, Bari).
Ciucci, G. (1989) *Gli architetti e il fascismo. Architettura e città 1922-1944* (Einaudi, Torino).
De Guttry, I. (2001) *Guida di Roma moderna: architettura dal 1870 a oggi* (De Luca).
De Seta, C. (1986) *Luoghi e architetture perdute* (Editori Laterza, Roma-Bari).
Falzea, M. (1993) "Il decostruzionismo americano ed il testualismo di Peter Eisemnman", in "Rassegna di Architettura e Urbanistica", n. 78/79, settembre/aprile, Roma, 161-212.
Giovannoni, G (1931) *Vecchie città ed edilizia nuova*, Torino.
Insolera, I. (1962) Roma Moderna. Un secolo di storia urbanistica (Einaudi, Torino).
Levi Strauss, C. (1962) *Il pensiero selvaggio* (Il Saggiatore, Milano 1964).
Muntoni, A. (2010) *Roma tra le due guerre 1919-1944, architettura, modelli urbani, linguaggi della modernità* (Edizioni Kappa, Roma).
Quaroni, L. (1969) *Immagine di Roma* (Laterza, Roma-Bari).
Rossi, A. (1966) *L'architettura della città* (Padova).

Lost in Realization, Spatial Fragments of Grand Urban Design Plans in the Industrial Age

Karsten Ley
Fakultät für Architektur, RWTH Aachen University, Schinkelstrasse 1, 52062 Aachen, Germany
Keywords: urban design plans, spatial fragments, Prussian urbanism, adaptability and persistence

Abstract

The industrialization brought forth not only urban planning as a method to anticipatorily shape the cities' building, but also a much more immediate dependency on market interests. When the great urban design until the industrial age were implemented with considerable energy from autocratic governments, the realization of urban plans since the early 19th century usually had to meet the demands of a variety of stakeholders and investors. Still, for the inevitable urban extension and transformation processes until 1945, planning authors and authorities largely abided by comprehensive design plans. A public negligence towards such morphological and spatial design considerations when meeting even slight opposition from the private economic sector, can be well seen with the German state of Prussia, which though being conservative in political terms highly supported a liberal market.

Arguably, this is the reason why a variety of grand urban plans there, from provincial towns to the capital itself, could not be fully realized or until today lack major features of the original design. At the same time, the ongoing transformation process obviously integrated these places well into the overall urban organism despite their primary fragmentariness. Against this background the proposed paper seeks to present different examples of inconsistencies in Prussian urban plans from 1862-1927 by pinpointing the spatial fragments in today's morphology, revisiting the original plans and their implementation, and eventually examining the different reinterpretations of the according torsos to better understand the adaptability as well as the persistence of urban design approaches within the cities' development.

Introduction

The industrialization brought forth not only urban planning as a method to anticipatorily shape the cities' building, but also a much more immediate dependency on market interests. When the great urban design projects until the industrial age were implemented with considerable energy from autocratic governments, the realization of urban plans since the early 19th century usually had to meet the demands of a variety of stakeholders and investors. Still, for the inevitable urban extension and transformation processes until 1945, planning authors and authorities largely abided by comprehensive design plans. A public negligence towards such morphological and spatial design considerations when meeting even slight opposition from the private economic sector, can be well seen with the German state of Prussia, which though being conservative in political terms highly supported a liberal market.

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Perceiving the Development of the Industrial City

More than in any other age the urban space of the industrial city is characterized by the «corridor street», that is clearly defining the urban space by its facades, which themselves derive from the close perimeter wall of the ubiquitous dense urban block. Moreover, following the economic reasoning of that time, the corridor street was supposed to be not only linear but also straight, such allowing for a rational distribution of land, simple geometrical plots, quick flow of traffic, etc. Especially for the major streets, the coincidence of neatly enclosing and tall facades with a precise linear direction called for a distinct «point de vue» of the corridor, that ought to be a great public building, a monument, or a perspective view into the urban or natural landscape.

The contemporary denomination of these streets as «avenues» (from French advenire = approaching) or «prospects» underline this form-functional relation. Exemption and at the same time validation of this urbanistic proceeding is the «boulevard» (French from Middle Dutch bulwerc = entrenchment). It started as a path for the flâneurs who sought to evade the density of the inner cities by strolling on the unbuilt glacis of the urban fortifications, when later an actual ring road replaced the military facilities and introduced the four to six storey bulk of the inner city urban block also to the former open space. Eventually, despite its overall circular scheme, the boulevard became divided into segments for which the same formal rules applied as for the avenue: linear corridor and point de vue.

Both avenue and boulevard soon produced the basic elements for any grand design plan, also comprising squares, plazas, and esplanades as embellishing public spaces – and of course as economic components to allow for higher market prices of those plots participating from such «Lagegunst» (favor of location). We recognize this procedure well already with the first coordinated urbanistic projects on the European continent outside Prussia: Hausmannien Paris from 1853 onwards, the Vienna Ringstraße and the Cerdá-Plan for Barcelona – both dating 1859. The goals of these as well as other projects all over Europe were deliberately outspoken: renewal and reorganization of the still mainly medieval urban structure for technical, military but largely economical reasons, and the architectural beautification for chiefly political and social reasons. Especially the private hand, mainspring and beneficiary of most extension activities, could count on the state's sanctioning of their new assets.

Retrieving Spatial Fragments

As for the design principles of that time, latest with Camillo Sitte's principal book «City planning according to artistic principles» we find the denomination of «geometric urbanism». When Sitte used this term to disavow the mainstream development seeking to advertise his «artistic urbanism», there is much truth in the general statement: Corridor street, perimeter block, and embellishing public space as a general rule joined in a rather simple manner, that is in orthogonal intersections. Diagonal connections became necessary usually only in cases, where major thoroughfares were cut into an existing fabric or when traffic purposes called for the establishment of a «star place» to connect several radial streets (compare Avenue de l'Opéra as cutting street and the Place de l'Étoile as traffic node).

This predictability is consequently also the key for retrieving the spatial fragments of the grand urban design plans. Such fragments will be found everywhere, were there is a deviation from the geometric rule. Following the two aspects introduced before, this means that either the «point de vue» is missing or blocked by an edifice not belonging to the plan, or that the «corridor street» is disturbed in height or in bulk. Of course, disturbances of the structural impetus of a grand design plan become obvious in plans, especially when they can be compared with the original design plan – if such a plan is producible. However, the immediate access to the fragmentariness is obtained only in situ, that is while experiencing the urban space itself. Only then one can determine, whether the disturbance is a historic morphological one drawing our attention out of mere scientific interest or also a contemporary spatial one that could be dealt with from a contemporary urbanistic point of view.

Berlin – Generalszug/Bülowbogen

The implementation of the Hobrecht plan in Berlin 1862 exemplifies the vast urbanistic approach towards the extension of the Prussian capital and its dilemma at the same time. Major element and well known example for the fragmentariness of Hobrecht's plan (despite its' ample execution) was the «Generalszug». This series of wide boulevards and squares was to connect the new urban center in the West at Kaiser Wilhelm Memorial church and Kurfürstendamm with the Südstern as part of a large ring street. It meant to connect the at this time autonomous municipalities of Charlottenburg, Schönenberg, and the Berlin suburb Tempelhofer Vorstadt (today's Kreuzberg) in the south of the central city. The name Generalszug (the generals' haul) derives from the denomination of the streets and squares, which were to commemorate the Prussian war of liberation against Napoleon 1813-1815.

The proposition for a large southern boulevard to promote the urban development was yet older. Peter Joseph Lenné and Karl Friedrich Schinkel worked from 1841 until 1855 on a plan for the «Schmuck- und Grenzzüge für die Stadt Berlin». The central figure of this urbanistic design plan, the «Wahlstattplatz/Blücherplatz» ensemble, was proposed for the very middle of the whole design scheme, taking up some 500 by 120 meters as a combination of a star square on the boulevard with a wide esplanade towards the north. However, already at the time of Lenné's planning the Potsdamer- (1838) and the Anhalter railway company (1841) advanced the city limits with their terminals, intersecting the planning area with large infrastructures and bordering the terrain of the double square.

The growing spatial demand for freight terminals and hump yards soon directed the railways attention to the planning area where the streets had been already laid out in sand, ultimately preventing not only the layout of the central figure, but also the whole interlink between the 1855-64 completed Bülowstraße at Dennewitzplatz and Hornstraße at Möckernstraße (without the originally planned Wartenbergplatz). Alternatively, in 1872-75 a re-alignment foresaw a diagonal deviation of the boulevard: Now it entered Yorckstraße at Mansteinstraße and tunneled the railway under a series of bridges some 400 meters further south as a parallel to the original alignment. Then it was again directed north at Katzbachstraße to re-enter the proper line at Großbeerenstraße – leaving the already developed Hornstraße as a cul-de-sac torso. Despite the extensive war and post-war destruction, street structure and urban morphology until today reveal the friction that lies behind

the realization of the Generalszug: the grand boulevard abruptly stops at a regular house façade and a railway embankment, while the bypass' layout does not conform to the primary characteristics (same corridor ratio but no proper artistic deviation nodes). Moreover, at large the originally envisioned street network of the extended city was compromised, separating the urban development of the rich districts of Schöneberg and Charlottenburg (the so-called «Neuer Westen») from the poorer Tempelhofer Vorstadt that soon featured the enormously dense «Mietskasernen» (tenement barracks). The building of the «Stammstrecke» (first metropolitan lightrail) from 1896-1902 made a virtue out of necessity in using only the western part of the boulevard. It connected the Western center with Potsdamer Bahnhof, while the eastern lightrail access situated further north completely avoiding the eastern boulevard and its less privileged residents (here the realization of public transport took place only in 1924/26 during the first republic).

Consequently, the failure of properly realizing the Generalszug produced a severe separation of the West and the Southeast of the city. Interestingly enough, neither the Fascist planning 1937-43, nor the reconstruction after World War II, nor the comprehensive re-planning after the unification 1989/90 ever seriously touched this issue. The proposition for the «Reichshauptstadt Germania» by Albert Speer at least foresaw a connection of the two parts of the boulevard by a tunnel, as it was not to interfere with the monumental «Nord-Süd-Achse» with the «Halle des Volkes» and the immense triumph arch.

The car-oriented rebuilding after World War II (e.g. «Hauptstadt Berlin» competition 1957 and West-Berlin zoning 1965) diminished the idea of grand boulevards altogether by supporting intersection-free highways to speed up traffic. Thus, the large areas of the Anhalter and Potsdamer railways were to accommodate the so-called north-south «Westtangente», manifesting the separation between west and east even more. Eventually civic protest forestalled this planning. From 1990 onwards a mixture of variable but mainly antagonistic interests by the German railway on one side (logistic center, real estate commercialization, high rise office buildings) and local residents on the other side (conservation of green, cultural reasons, legalization of informal buildings, preventing traffic and new development in general) ultimately led to the minimal consensus for a large park. This nevertheless retains the morphological separation of the adjacent districts. Spatially, however, the predicament resulted in two intriguing responses at the western torso of the boulevard at Dennewitzplatz: one for the period 1875-1945 and another one since 1945.

Instead of a proper «Schmuckplatz» (embellishing square) on the boulevard, a retarding element before entering the immense Wahlstattplatz/Blücherplatz ensemble, Dennewitzplatz now had to facilitate aesthetically the deviation of the haul to the south. To do so, the new planning foresaw a church («Lutherkirche») as point de vue of Bülowstraße with its nave orientating to the south to also spatially divert the flow of traffic towards Yorkstraße. Consequently, the eastern side of Dennewitzplatz, where the boulevard originally should have left the square, merely formed the background for the new architectural feature that was built 1891-94 by Johannes Otzen. Such the whole Dennewitzplatz ensemble moved slightly to the South and took up much more space, also to allow for a sound flow of traffic. Arguably, because of the thus aggravated heavy real estate pressure the northern side of the square did not widen but remained in line with the profile of Bülowstraße. Given this geometry, the central plot did not allow for a true axial situation of the church-tower towards the middle of the boulevard, but only to the southern driving lane directing to it.

When the Stammstrecke was projected some five years later, also the course of the elevated light-rail had to be adjusted to the given circumstances, resulting in the «Pastorenkurve» (pastor curve). This curve redirected the railway from the middle of the boulevard's profile towards the northern facades of Dennewitzplatz and then piercing the perimeter block in the east in a «Hausdurchfahrt» (residential thoroughfare) to enter the railway area, which had become property of the Prussian state in 1880. The local residents soon referred to their «Kiez» (quarter) as «Bülowbogen» (Bülow bend), what at the same time reflected the redirection of the boulevard, the curve of the light-rail and the arched thoroughfare [Fig. 1]. Especially the latter soon developed into a spatial icon not only of the "failure" of the Generalszug, but even more for the vibrant rising industrial metropolis that Berlin developed into especially in the roaring 1920s – to then be destroyed in an air raid in November 1943.

Figure 1. Berlin Dennewitzplatz with Lutherkirche around 1905 (public domain)

Since World War II and the willful demolitions in its aftermath, the area of Bülowbogen remains a triple torso. In a chronological as well as in a spatial order today's visitors experience at first the shakiness of the overall morphology with its unclear functional and formal directions. Secondly, it is the unproportioned assemblage of main buildings (Lutherkirche) and structures (Pastorenkurve). Ultimately, it is the fragmented building typology with torn open perimeter blocks, rededication of streets and places and imprudent furnishing of the public space. All this gives today a marvelous example of «spatial archaeology» that enables us to read the history book of the urban development in this very place.

Lennep – Gartenstraße/Wiesenstraße

At a much smaller scale we find a boulevard fragment also in the provincial town of Lennep, while again this fragment gives evidence to the inefficacy of a whole great ur-

ban design proposal. The original medieval circular shape of the Prussian county seat remained unaltered for more than 600 years – despite the loss of almost all medieval buildings in a fire in 1746, which led to a thorough re-building of the town in a local Baroque style. Only with the industrialization and the establishment of large textile factories the development pressure rose. In 1790 the fortifications were razed and the town developed at first towards the waterways in the southwest. To support the urbanization process the city council commissioned in the penultimate decade of the 19th century the renowned urban designer Hermann Joseph Stübben from Cologne to work on a general sewage system and later also on an extension proposal.

Stübben's plan likewise followed and extended the general radio-concentric layout of the «Altstadt» (old town) as he incorporated the spontaneous developments since the beginning of the century as well as the construction of the railway since 1868, ultimately foreseeing a population growth from 1.200 to 10.000 inhabitants. The design scheme featured three boulevards, offsetting the original circular Wall Street that had been established already with the demolition of the fortification. The middle boulevard was to accommodate the railway station as well as in close vicinity a new town hall [Fig. 2]. The actual development of the «Neustadt» (new town), however, started in the south, close to the also developing industries along Rotzkottener Bach and the Siepen and manifesting the earlier developing axis of Kölner Straße. Especially the north of the town remained somewhat rural, only slowly raising attention with the better-off citizens for their villas and mansions.

The population forecast proved terribly wrong: the surrounding industrial hot spots of Remscheid, Solingen, Elberfeld, and Barmen seized all potential entrepreneurs and workers. Eventually in 1929 Lennep was not only losing its role as county seat but was altogether incorporated as borough into the metropolitan area of Remscheid. Thus, the design layout – although it remained chiefly effective until World War II – never led to a dense urban morphology as envisioned at the end of the 19th century. Spatially this whole development can be observed at the area of Gartenstraße/Wiesenstraße in the northwest. Coming from the railway station, Gartenstraße features some grand three-story townhouses. Then, suddenly, the street follows a sharp turn to the east, missing its continuation on the other side of Thüringsberg by the whole house width of a two-storey detached residential building. The following Wiesenstraße then features mansions and villas, while the original circular boulevard alignment again unexpectedly stops when the street makes a 90-degree turn to the north.

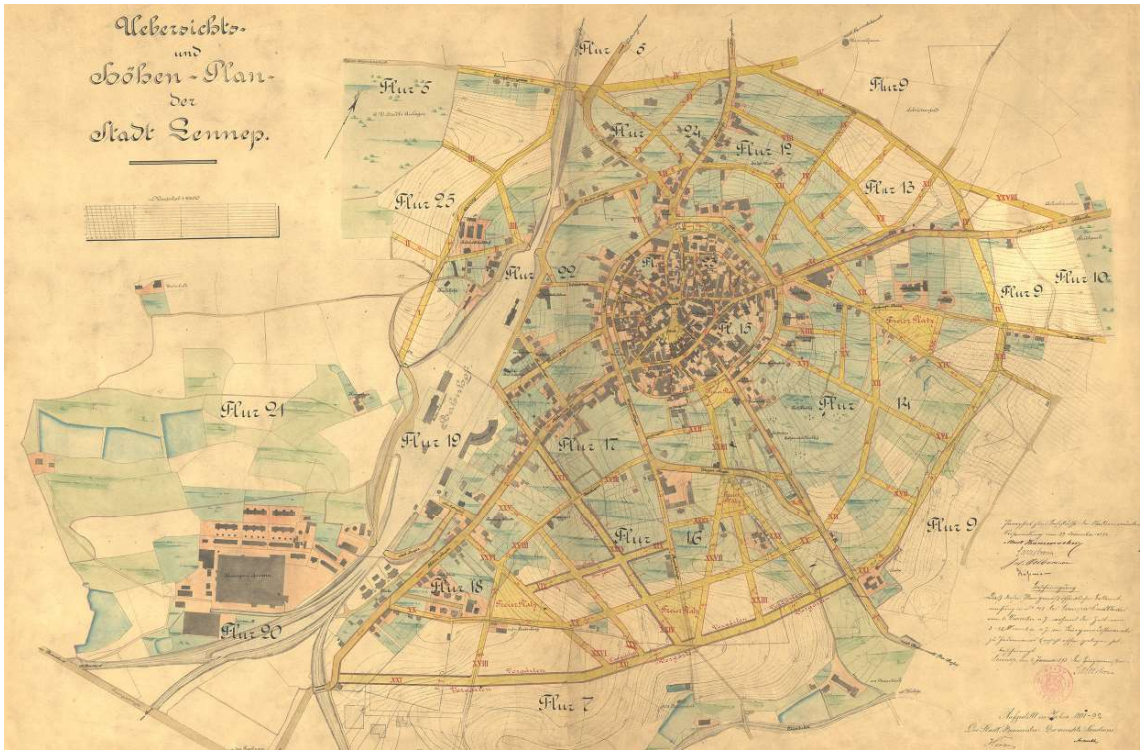
Interestingly enough the change of spatial character is also reflected in the street names, as the urban «Garden Street» turns into the rural «Meadow Street». As there is comparatively little destruction in the northern parts of Lennep's Neustadt, the inchoate character of the original spatial organization is obvious. In fact, the spatial appearance is almost incongruent to the figure ground – let alone the proposed alignment, of which there is still considerable resemblance on a map. Thus, the morphological traces for Stübben's boulevard have to be diligently ferreted out of this particular urbanistic situation.

Cologne – Kaiserstraße

A most prominent spatial fragment of an avenue within a great urban design plan can be found immediately in the heart of Cologne, in front of the immense cathedral. This center itself is a product of the industrial age: both the cathedral and the adjacent central railway station were finished only in the last two decades of the 19th century – relocating the civic emphasis away from the «Alter Markt» (old market) with the medieval city hall to the prestigious new monuments. Due to this change, the public discussion claimed soon also a modification of the urban space around the cathedral. For centuries the area featured a big variety of buildings, with both profane and sacred use, closely sealing off the construction site, in which the gothic torso rose up well 40 meters over the neighboring roofs. This seemed to be outdated and inappropriate for the national, cultural, and technological accomplishment of completing a vast medieval building.

The spatial expectation of the contemporaries was a great and full view onto the monumental church. This idea referred not only to the general understanding of this time.

Figure 2. Lennep Stübben Plan 1891/92 (KatA Stadt Remscheid)

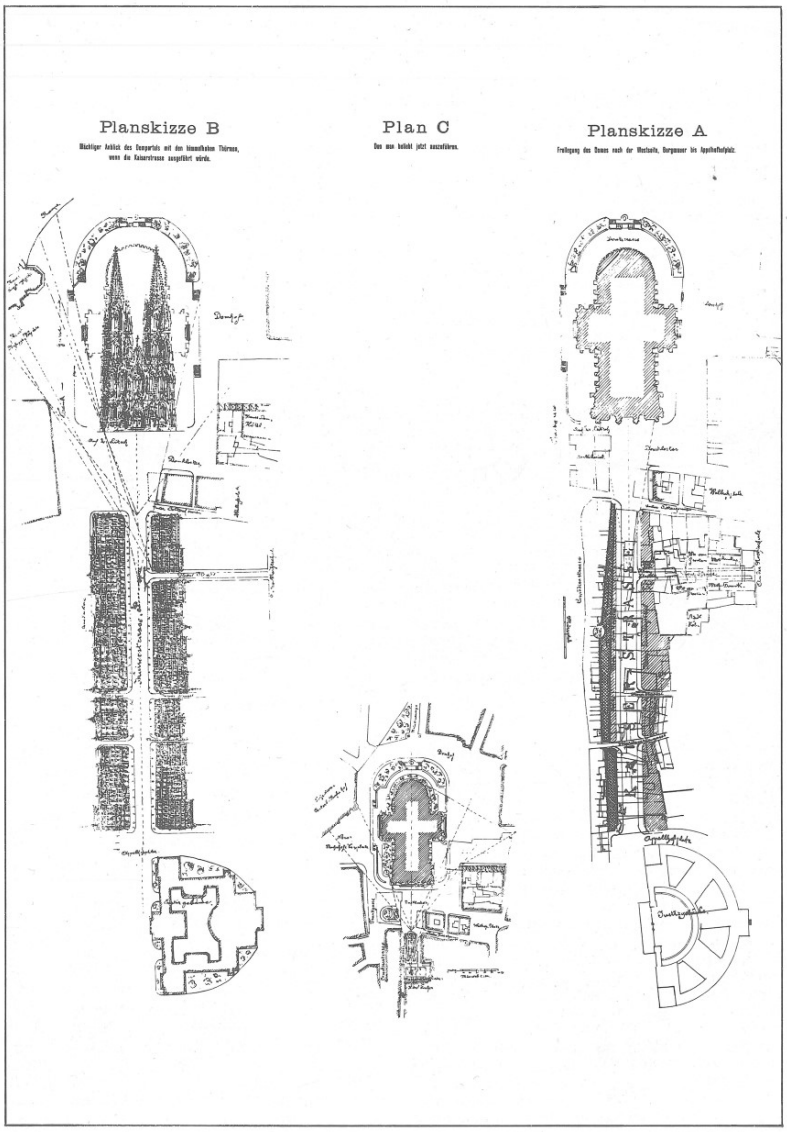


It was especially due also to a range of illustrations in the first half of the 19th century, which envisioned the continuation of the building works or even completion of the perfect Gothic cathedral. They advertised not only for the ideological support but also for donations (e.g. the paintings by Carl Georg Hasenpflug 1834/36, Carl Emanuel Conrad 1856, or the etching by Jakob Schreiner 1872). These illustrations often showed a picturesque perspective from the south-west of the cathedral including the main western façade and parts of the nave and the southern transept – within an urbanization that resembled the contemporary one but without any disturbing building development close to the radiant edifice. Obviously, the actual building situation was very different: narrow, crowded streets and a relatively tiny open space in front of the church, while all other sides remained blocked by different houses – altogether, the standpoints suggested by the illustrations were not at all accessible by the passer-by.

Thus, after the cathedral's completion, especially of the west façade with the two high-rise towers, one sought to create such a standpoint from which the building could be seen as a whole; a commission was installed to discuss this urbanistic issue. Several architects and planners presented according suggestions with a variety of spatial approaches, such as Wilhelm Wilmeroth 1883, Hermann Joseph Stübben 1885, Carl August Philipp 1885, and Friedrich Carl Heimann 1885. All propositions included a wide range of demolition work around the cathedral, some of which affected historic buildings that dated back to the middle ages. In 1886 Jakob Kaaf eventually published a plan of an earlier idea of his (~spring 1885) that sought not only to produce an urban space that would accommodate a standpoint for the western perspective, but a whole new urban axis leading from the extant Appellhofplatz directly to the cathedral. The city's architect Hermann Weyer slightly altered Kaaf's plan by extending the new «Kaiserstraße» to meet Friesenstraße at the old tower of the Roman fortification to fully integrate the new street into the city's street system [Fig. 3].

However, in December 1887 the Prussian state government advises postponing the realization of the Kaiserstraßen-Projekt due to its size and to abide by a smaller solution (the Heimann project revised by the chapter's architect Richard Voigtel) that still would allow

Figure 3. Cologne «Kaiserstraßen-Projekte» 1887/88 (Comparison by F. C. Heimann; in: Borger 1980, 123)



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for a later execution. In addition to several demolitions beforehand, from 1891 onwards the buildings Fettenhennen 15 and 17, Burgmauer 1 and 3 as well as Margarethenkloster 2-8 and the development north of the commercial building Schaeben were destroyed, to allow for the construction of a rather small embellishing square that would accommodate the envisioned viewpoint. The area immediately in front of the west façade, to which the embellishing square opened was foreseen as traffic node, organizing the different pedestrians and later vehicular flows from Hohe Straße (High street), Komödienstraße (comedy street), and Trankkgasse/Bahnhofsplatz (station square). Main reasoning behind discarding this great urban design scheme, as suggest the different newspaper contributions of that time, was that the possible amount for commercial floor area at the new street development. As most of the buildings that were to be demolished were owned and used the members of the cathedral's chapter, the required residential floor space would have been too high to make the actual project profitable.

The proposed disentanglement of the cathedral from its immediate built environment as well as the ideas for realizing grand perspective urban spaces as a whole, yet, also fall together with a thorough change of urbanistic ideals: In 1889 Camillo Sitte published his

Figure 4. Cologne «Domplatte» towards Burgmauer and Margarethenkloster 2015 (Karsten Ley)

essay on «artistic urban design» that harshly questioned the Belle-Époque Hausmannien style of the straight corridor street. Sitte proposed rather a picturesque and perspectival ambiguous urban space following principals, such as curved corridors, series of small squares, closeness of the perimeter facades within a square etc. In August 1893 finally the Kaiserstraße project was discarded altogether. The area of the remaining embellishing square, not more than a triangular small green space at the foot of the cathedral's towers, was eventually determined in 1899, the surrounding buildings – all of them in a Neo-Gothic attire – followed from 1898 until 1903.

When the devastating air raid destructions of World War II obviously resulted in an exchange of architectural style and dimensions also in this particular place, the efficacy of building lines and property borders remained outmost powerful. The geometry of the square is literally the same as it was well 100 years ago. Still, the embellishing character of the place was given up by locating two pavilions on the green middle. The transformation of the place immediately in front of the cathedral into an elevated pedestrian zone («Domplatte») 1964-70 also spatially aggravated the separation from the square. Today, approaching the cathedral is a rather simple task for the visitor: From the station as well as from the Hohe Straße as economic heart it is immediately visible. Confusing, still, is the variety of spaces and directions leading away from the cathedral. Here the centrally located space in front of the western façade, which is neither directing to any particular function nor establishing any particular design form, is a misleading morphological figure, which is not more than a resemblance of a historic plan [Fig. 4].

Conclusion

Three examples out of a variety of such spatial fragments show that the implementation of grand urban design plans were troublesome in 19th and 20th century Prussia – and much research should/could be done on the socio-political reasoning behind this. Focusing on the morphological and spatial impact of these fragments, however, the examples epitomize three different grades of impact with respect to the adaptability of the original urban plan.

In Lennep the urban design by Stübben proved to be too elastic, allowing for a variety of development and resulting in a disbandment of the original spatial intention. Arguably, no urbanistic intervention of today could resolve the disturbance that one perceives walking through Gartenstraße/Wiesenstraße. In Berlin obviously the Bülowbogen represents a veritable setback of Hobrechts's idea; still, the odd deviation of the boulevard became part of the overall scheme, showing a remarkable degree of flexibility and resulting in an almost debonair urban crankiness (that though used to be more charming before the war destruction). In Cologne, yet, the widening of Burgmauer/Margarethenkloster remains a true formal and functional torso; if anything, here an intervention is needed to reconcile the factual urban space with an urbanistic design approach.

Nevertheless, in any case the grand urban design plans of the industrial age gleam through the contemporary urban morphology and space – representing not only a page of the urbanistic history book but also a reliable framework for the future urban development.

References

Behrendt, W. (1911) *Die einheitliche Blockfront als Raumelement im Städtebau* (Cassirer, Berlin).

Hugo Borger (1980) *Der Kölner Dom im Jahrhundert seiner Vollendung. Katalog zur Ausstellung der Historischen Museen in der Josef-Haubrich-Kunsthalle Köln vom 16. Oktober 1980 bis 11. Januar 1981, 3 vols.*, (Kölnische Verlagsdruckereim, Köln).

Bruch, E. (1870) *Berlin's bauliche Zukunft und der Bebauungsplan* (Kommissions-Verlag von Carl Beelitz, Berlin).

Curdes, G.(1990) *Die Entwicklung des Aachener Stadtraums Aachen. Der Einfluß von Leitbildern und Innovationen auf die Form der Stadt* (DortmunderVertrieb für Bau und Planungsliteratur, Dortmund).

Curdes, G. and Ulrich, M. (1997) *Die Entwicklung des Kölner Stadtraumes. Der Einfluß von Leitbildern und Innovationen auf die Form der Stadt* (DortmunderVertrieb für Bau und Planungsliteratur, Dortmund).

Fehl, G. and Rodríguez-Lores, J. (1995) *Stadt-Umbau* (Birkhäuser, Basel).

Fraquelli, S. (2008) I*m Schatten des Domes. Architektur und Neugotik in Köln 1815-1914* (Böhlau, Köln/Wien/Weimar).

Hegemann, W. (1930) *Das steinerne Berlin* (Hegner, Lugano).

Karnau, O. (1996) *Hermann Josef Stübben. Städtebau 1876–1930* (Vieweg, Braunschweig/Wiesbaden)

Kieß, W. (1991) *Urbanismus im Industriezeitalter* (Ernst&Sohn, Berlin).

Ley, K. (2003) 'Il pensiero urbanistico in Germania: trattati e formazione disciplinare alla fine del XIX secolo', *Bollettino del Dipartimento di Urbanistica e Pianificazione del Territorio* (Univ. Firenze), 1-2, 3-12.

Ley, K. (2005) *Raum, Zeit, Funktion. Die Dimensionen der Achse im Städtebau* (FdR, Aachen).

Ley, K. (2009) *The Urban Matrix, Towards a Theory on the Parameters of Urban Form and their Interrelation* (FdR, Aachen).

Matzerath, H. (1981) 'The influence of industrialization on urban growth in Prussia (1815-1914)', in Schmal, H. (ed.) *Patterns of European Urbanization since 1500* (Croom Helm, London) 143-80.

Metschies, M. (1991) 'Zur Geschichte von Lennep.. Ein Überblick', in Metschies, M. (ed.) *Schulgeschichte des Röntgen-Gymnasiums in Remscheid-Lennep. Festschrift zum 75jährigen Jubiläums des Schulgebäudes 1916 - 1991* (Verein der Freunde des Röntgen-Gymnasiums, Remscheid) 1-54.

Piccinato, G. (1977) *La costruzione dell'urbanistica, Germania 1871-1914* (Officina Edizioni, Roma).

Rodríguez-Lores, J. and Fehl, G. (1985) *Städtebaureform 1865-1900* (Christians, Hamburg).

Schilling, O. (1921) *Innere Stadt-Erweiterung* (Der Zirkel, Berlin).

Schmidt, W. R. (2000) *Albert Schmidt, Baumeister, Ingenieur, Architekt (1841–1932), Ein Leben in der bergischen Kreisstadt Lennep* (Imbescheidt, Frankfurt/Gießen)

Philadelphia: study of a metropolis

Alessandra Passiatore
Facoltà di Architettura, Politecnico di Bari, via Orabona 4, 70125, Bari, Italy
Keywords: Aggregation, Row House, Housing Type, Specialized Building

Abstract

The proposed work is the outcome of a research thesis developed during a workshop group in academic degree2010/2011. The thesis research conducted aims to knowledge of the development of the case that hit the city of Philadelphia, its characters aggregation and construction of the base. The process used, therefore, aimed to the knowledge of the city through a gradual change of scale, from the local to the aggregate, up to reach the scale of the housing type carrier: the row house. The assumptions underlying the search consists of a real challenge: to understand whether or not there is a chance to know the city through the method "Muratori", typically Italian, even in a world so different and highly planned, such as that of American metropolis. Being a city of foundation, the reading of the complexity of the urban organism was conducted through a mode of analysis that could be called "deductive", the distribution of "specialized building" along a path, was not considered as the testimony of a value, a priori attributed to the same, but as the first motivation with which a hierarchy of values attributed to the multitude of paths that can outline an American metropolis like Philadelphia. Although the plan of the city has from the beginning had a well-defined system, isotropic and symmetric, a series of urban dynamics of spontaneous formation altered the original plan to create the Philadelphia of today.

Introduction

The proposed paper is the outcome of a research developed during a final workshop in the academic year 2010/2011. This thesis is the result of a teamwork consisting of D.Altamura, A. Di Biase, M. Mundo, A. Passiatore, S. Pellicani and M. Somma, with Professor Attilio Petruccioli as a supervisor and Professor Matteo Ieva as a tutor. The research carried out aims to understand the development of the city of Philadelphia, its characteristics of aggregation and construction. With this objective, the process used has tried to recognize and analyze the city through a gradual change of scale, from the territory to the urban fabric, reaching the scale of the essential building type: the row house. The underlying assumptions of this research constitute a significant challenge: realizing whether or not there is a chance to understand the city by using the Italian method " G. Caniggia", even in a so different and highly planned world as the American Metropolis.

Methodology

The study of the city of Philadelphia cannot leave aside an analysis of the transformation and evolution of the urban tissue. This analysis will allow featuring the reasons and the method of growth of the urban settlement by connecting the study of the main routes, mainly the territorial ones, which have allowed reaching the site even before its foundation as a city. Since this is a founded city, the interpretation of the urban complexity has been carried out by a "deductive" methodology, and so the distribution of "specialized building" along a route has not been considered as evidence of a specific value, but the first reason to assign a value hierarchy to the multitude of routes that defines an American metropolis as Philadelphia.

Forming process

Summarizing the main phases of expansion of a city is always a difficult task, especially when talking about an American Metropolis, and even more when analyzing a city like Philadelphia, generated by the composition of a collection of districts defining a so particular form which we all are already able to recognize.

The territorial paths which, even before the foundation of the city, have allowed reaching this portion of land (highly favorable due to its orographic and hydrographic conditions) have an essential role for understanding urban morphology.

As an evidence, there is a map drawn up by Thomas Holme in 1681 "A map of the Province of Pennsylvania", where it's possible to see the distribution of boundaries on the land owned by William Penn, founder of Pennsylvania, showing the prevision for the foundation of the city on the "bag" delimited by Delaware River and its tributary, the Schuylkill River. This area was a highly productive place because of its marshy condition, and easily accessible due to the condition of navigable of Delaware River.

Considering these premises, this reading has been conducted on a portion of the city, approximately corresponding to the City Center, the area bounded on the East and West by two rivers, on the North and South respectively by *Poplar Street* and *Wharton Street*. An analysis of its urban morphology is provided by dividing the urban evolution on 4 phases, signed by 4 relevant dates which summarize the main processes of transformation of the urban tissue, scanning the city's history by periods of about 60 years.

Reading the urban form - 1796

The date that the archives sources recognize as the city foundation is 1682, when English settler Thomas Holme was arrived in Philadelphia and founded a first urban settlement. The design of the city was structured on the basis of the idea that William Penn had a City-Garden (Green Country Town), a regular grid of streets that stretched between the two rivers, bounded on the North by *Vine Street* and South of *Cedar Street* (now *South Street*), divided into four quadrants by two 100-foot deep arteries: *Broad Street*,

North-South artery and *High Street*, East West artery (now *Market Street*); in the middle of each quadrant a large square of approximately 8 acres of public land (*Franklin Square* in the North-East, *Logan Square* in the Northwest, *Rittenhouse Square* to the Southwest and *Washington Square* Southeast) and a structured central square at the intersection of two great arteries with governmental and religious centre of the city, *Penn Square*.

This original idea of the city, with the belief that the inhabitants would have occupied at the same time both sides of the two rivers, extending gradually toward the center, remained only an idea, because the colonists settled mostly along the riverside of the Delaware River, and it passed a century before the settlement on the lands along the Schuylkill River.

Even if the historiography considers that the British colonizers founded the city of Philadelphia, there was already a first settlement before the English conquest of the territory. However, it is not appropriate to consider this first settling as a real urban development, because this concept, besides when minimal, should be constituted by housing units around other buildings with specialized services functions, and the settlement found by British colonists only consisted of shelters formed in caves, deep about 3/6 feet, completed with some curtains and located on the banks of the Delaware River, in the area of *Dock Bay Creek* (current *Dock Street*).

These first settlers, basically, marked the boundary of these holes in the rock with low walls, covered with roofs made of branches and lumber, and completing the "structure" with stone and cobble chimneys.

Unfortunately this first "elementary settlement" remains just a historical description, because in 1687 the Provincial Council ordered the demolition of all these structures.

The analysis shows that the city, in this period, was developed not farther than *Callowhill Street* on the north, Christian Street on the South and *Ninth Street* on the West, mainly extended along *Front Street* and *Market Street*.

It is surely not only a coincidence if those paths have structured the articulation of the urban tissue, as they are they are the two most important connections in the territorial scale, linking Philadelphia respectively to Bethlem and York.

Regarding specialized building, in that period it is certain the presence of 24 houses of worships, 8 cemeteries, 2 schools, 3 hospitals, 2 banks, 5 public buildings including the State House, City Hall and the County Court House and 3 markets. The identification of their location in the urban tissue has confirmed a typically urban structured behavior: "antinodal" buildings as cemeteries and hospitals are at the edge of the city, while the rest of the construction section is strongly "nodal". In particular, it was assigned great importance to the intersection of *Market Street* and *Second Street*, becoming a nodal area by concentrating the most of the specialized building: Christ Church (Protestant Episcopal Church), Baptist Church, Friends Meeting House, First Presbyteran Church, and a large open-air market consisting of wooden stalls, which was soon replaced by a permanent brick structure at the intersection of both paths.

Trying to briefly describe recognizable urban hierarchies at this early stage of expansion, definitely *Market Street* (formerly *High Street*) and *Front Street* become a "matrix route", while *Second Street*, whose intersection with *Market Street* determines the main urban node, becomes a "planned building route".

Reading the urban form- 1860

The second phase that is considered is1860, as this date reports the main transformations developed on the city in a range of near 60 years from the previous described condition. Even in this case, as it will happen in the following phases, the Cartographic support was crucial for the purposes of reading (interpreting) performed.

The most surprising thing is the speed of expansion of the city in such a short time. The Downtown is more than doubled compared to the previous condition, reaching *Fairmount Avenue* on the North, Washington Avenue on the South and almost the Schuylkill River on the West, as it is extending roughly until the *Twenty-second Street*.

Even in this case, the distribution of specialized building gives rise to some important considerations about the hierarchy of paths: *Market Street*, as it is shown on the original design, represents the main East-West route, both for the road aspect (as it is higher than all the others, in fact), both for a remarkable concentration of specialized building, especially markets and public buildings.

Besides *Walnut Street* and *Race Street* have an important role, even if they are hierarchically subordinated to Market Street, as these two routes hold respectively Washington Square, Rittenhouse Square, Franklin Square and Logan Square. This is not only to the highly specialized routes that they configure, but mostly because of the identification of the influencing area of the blocks which are aligned in these paths, as it appears clear that, with only some exceptions, all the lots in that area are arranged orthogonally to the paths, disposed facing the street. For this reasons it is impossible not to give these three routes a "matrix route" condition, recognizing, of course, higher value to *Market Street* and less to the other two.

With the increase of the expansion of the city, it can be clearly seen that *Second Street* transfer its "planned building route" condition to *Ninth Street*, continuing as *Ridge Avenue* from the intersection with *Vine Street*. The reasons should be found on its territorial role, as it is a connection with the hinterland. However the importance of this route is evidenced by the fact that this is configured as a real axis equipped with a multitude of markets facing the street.

Broad Street, in this phase of expansion, has not taken the role of main artery yet, as it was proposed by the original plan, anyway, it begins to become specialized as an important axis of production due to the concentration of factories, stores and warehouses.

However, the great transformations and dynamics of the urban fabric should not be considered an isolated argument, as they are connected to the rise of the railway, just in the early 1.800. This fact has generated a series of mechanisms on space and social configurations of the city.

The construction of the railway line began in 1832, in order to define a real public transport system for Pennsylvania which would have taken the State to the same level of New York and Ohio, already equipped with a channel and a railway line. In the city, the railway line started from the intersection of *Broad* and *Vine Street*, and headed north toward *Noble Street*, then west toward the *Twenty-second Street*, where turned again toward the north, crossing the Schuylkill.

When the system was inaugurated, in 1832, it was arriving not farther than the city border, *Vine Street*; that's why the year after it was opened a new rail line on *Broad Street* between *Vine Street* and *South Street*.

Despite the rail line was hailed as a great innovation and a great boost to the commerce of the city, it was really almost a dozen blocks far away from the shopping heart of the urban area, so many traders asked for an extension of the railroad on *Market Street* until Delaware. In 1838 it was opened this new railway line, producing in the heart of the city several long-term effects, such as the increasing tendency to concentrate main activities in the east part of the city, and the focusing on the productive character of Broad Street, that was already fixed by the own railway line. It was only toward the end of the '60s, when this part of the railway line was removed, so the character of *Broad Street* changes toward the one previously planned.

In the '30s of the XIX century other important railway lines were built in the region of Philadelphia with the main objective of strengthening the connections between the districts and the heart of the city and the Delaware: in April 1831, the rail of Northern Liberties and Penn Township began his service from *Willow Street*. This railroad ran from Delaware until joining the state system on *Broad Street*; in November 1834 the Southwark Railroad began to work, which was connected with the city rail on the crossroad between *Broad* and *South Street*; in the same month even the Trenton Railroad began to operate, running from Front Street to the district of Kensington and to the town of Trenton. Finally, it was in 1838 when Wilmington and Baltimore Railroad was inaugurated, crossing the Schuylkill and connecting to Southwark Railroad.

Besides, the increasing production of coal stimulated the construction of a new rail-

Figure 1. Reading urban form 1796: The analysis shows that the city, in this period, was developed not farther than *Callowhill Street* on the north, *Christian Street* on the South and *Ninth Street* on the West, mainly extended along *Front Street* and *Market Street*.
It is surely not only a coincidence if those paths have structured the articulation of the urban tissue, as they are they are the two most important connections in the territorial scale, linking Philadelphia respectively to Bethlem and York

way line, the Reading Railroad, which was inaugurated in 1842, aiming to strengthening the industrial city. The system connected the mentioned routes, Northern Liberties and Penn Township, generating significant upheavals on the structure of the urban fabric.

The Reading Railroad became a fundamental value in the choice of the location of factories that mainly settled in the north-west of the Downtown. Since 1850 the heavy industry began to focus this part of the city, causing the settlement and concentration of many workers in the area.

The previous considerations, and so the cartography used, have helped us to draw the limits of the production area referred to 1860, an area that is extended roughly between *Spring Garden Street* and *Callowhill Street*, in the west part of *Broad Street*.

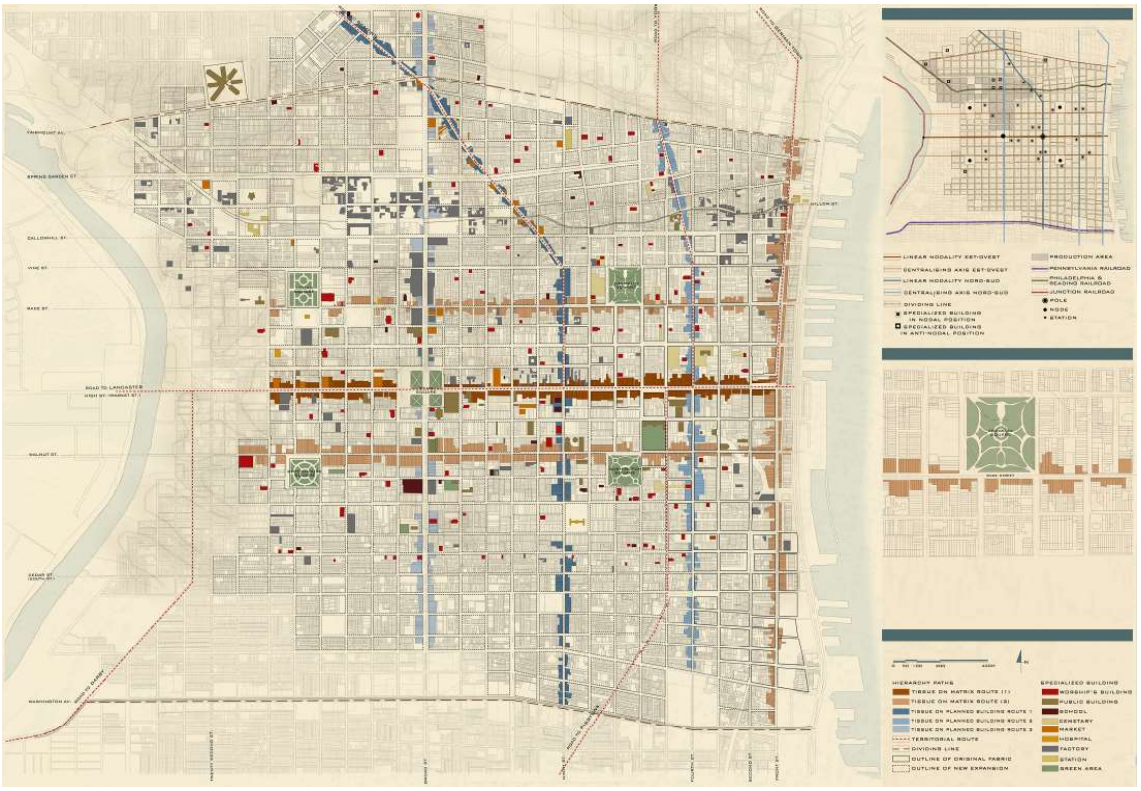
Finally, in 1860 the main urban pole is defined on the intersection between *Market Street* and *Ninth Street*, both of them considered "main linear nodes", with *Walnut Street* and *Race Street* recognized as "centralizing paths" in the east-west direction, and *Fourth Street*, *Broad Street* and *Front Street* as "centralizing paths" in the north-south direction. Whereas the other boundaries of the city, *Fairmount Avenue* and *Washington Avenue*, are considered, because of their condition of marginality, "dividing lines".

Reading the urban form - 1922

The penultimate year considered is 1922, which defines a strategic period for the innumerable transformations involving the city.

Describing the many mechanisms of transformation of an American city should ap-

Figure 2. Reading urban form 1860: The most surprising thing is the speed of expansion of the city in such a short time. The Downtown is more than doubled compared to the previous condition, reaching *Fairmount Avenue* on the North, *Washington Avenue* on the South and almost the Schuylkill River on the West, as it is extending roughly until the *Twenty-second Street*



pear as something of low value if not related to the great social dynamics affecting the population in that period.

It is easy to imagine how the current city has reached an excessive size, as it has already incorporated within its municipality the multitude of suburbs previously mentioned. However, in the intent of "reading" the City Center form, we shall try only to list the consequences that the large social dynamics have caused in the structure of this portion of the city.

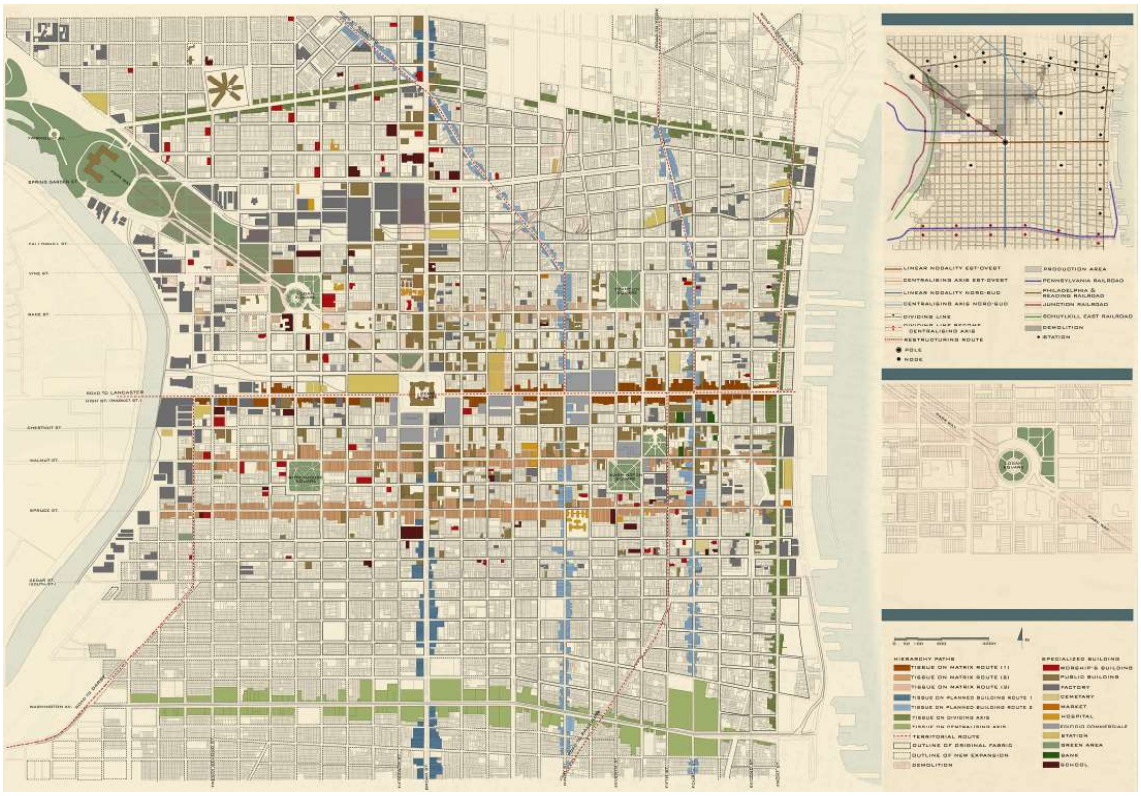
The oldest part of the city, covering roughly the area from *Seventh St*. to Delaware, becomes an overcrowded area with poor quality of urban life, caused by the constant flow of immigration.

This motivates the moved to the west of all those commercial and productive activities that were held by the *Ninth St*., causing the *Broad St*. final conquest of the role which was originally planned for.

However, *Ninth St.* and *Fourth St.* continue to configure both "centralizing paths", even if in a lower level than before, and not only because of the concentration of specialized buildings - mainly public and worship houses - but because of its condition of extensions of territorial paths which still connect with the hinterland. In this years, the increasing value of *Broad St.* is also determined by the construction of the City Hall, in the center of *Penn Square*, the intersection of *Market St.* and *Broad St.*

The growth toward the west of the city had determined the need of a shift of civil and administrative centers, which until then had been headed by the Independence Hall, in the intersection of *Chestnut St*. and *Fifth St*. This displacement meant the movement of the entire financial and administrative heart of the city. From the analysis, in fact, *Broad*

Figure 3. Reading urban form 1922: A new structure of urban hierarchies is already defined, which sees the City Hall and the Art Museum become the two great urban poles connected by an important "restructuring route". Therefore, it is not a case that *Franklin Square* begins to lose importance in urban dynamics, as the Art Museum, playing the role of a real pole in a metropolitan scale, has produced a concentration of functions and attractions around itself, devaluing the east part of *Broad St*



St. appears as an important "main linear node", a highly specialized path, mainly near the center and in the north area of *Market St*. While the heart of the city has the tendency to be positioned precisely at the intersection of the two large arteries, *Front St.*, which in a first phase had assumed a key role in the structure of the urban tissue, begins to be considered more and more as a limit, in its wide condition of marginality.

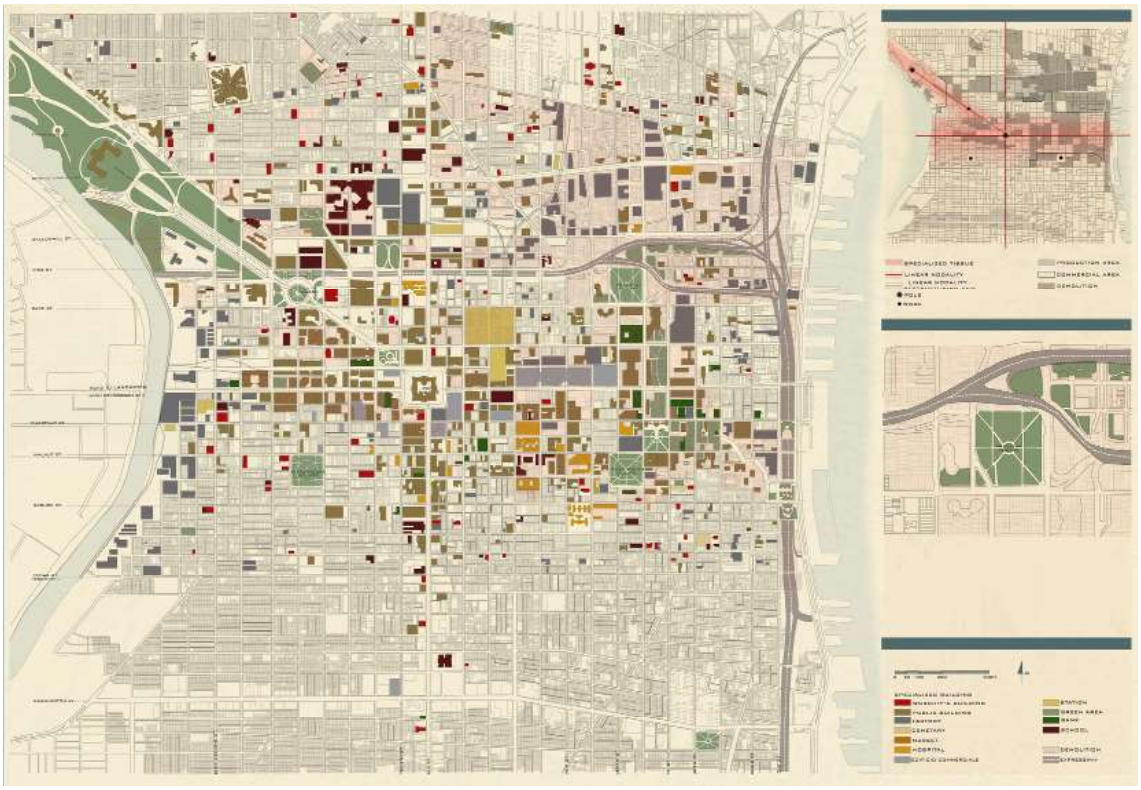
At the same time, whereas on *Broad St*. there is a greater concentration of administrative specialized buildings, *Market St.* becomes a manufacturing and commercial corridor, even if playing an important role in the articulation of the urban organism.

It is important to notice that, continuing with the previous condition, *Walnut St.* goes on with its configuration of a specialized "centralizing routes", in the same way that happens with *Spruce St.* As a consequence of this, an all section of city, bound by those streets, becomes a specialized section, characterized by a high quality of urban life (as information resources explained) which increase even more the importance of the two squares, *Washington Square* and *Rittenhouse Square*: the real urban nodes.

It shall be underlined the different success of the four main squares in the original plan: while, as already said, the two squares on the south of *Market St*. become urban focus, *Franklin Square* and *Logan Square* forgive their original importance, first of all, because of the lower valence of *Race St*.

However, the two squares will have a different luck: *Franklin Square*, because of its location also, and because of the reasons already pointed out, loses any connotation of square, being considered simply as green area, and with poor quality indeed. Even *Logan Square* loses its connotation of square, being inserted in one of the most revolu-

Figure 4. Reading urban form current condition: It is possible to imagine that the argument is too vast to be reported only to the City Center, which today represents only a small part of the whole municipality.
The intent to synthesize the urban hierarchies seems a bit forced, due to a complexity of routes and valences that should be read over the entire metropolitan scale



tionary and important urban intervention in the history of the city of Philadelphia: the construction of the *Parkway*.

Near the end of the 800, the awareness of a city that was assuming a shape without nor rules neither planning, had triggered a great desire to reconnect the various parts of the city by overlapping to the regular grid a series of diagonal paths, with the model of the great Parisian boulevards.

In addition to this, there was also the need to connect the *Fairmount Park*, the largest city park, to the heart of the city, that is, the City Hall, and so, for the implementation of the great boulevard, Benjamin Franklin was called in 1957. It was required the demolition of a considerable portion of urban construction. The bibliographic sources tell it was 1907 the date of the approval for the demolitions around *Logan Square*.

With the construction of the Art Museum, at the end of the *Parkway*, it is definitely confirmed that these great operations have completely altered the dynamics of precedent urban fabric.

A new structure of urban hierarchies is already defined, which sees the City Hall and the Art Museum become the two great urban poles connected by an important "restructuring route". Therefore, it is not a case that *Franklin Square* begins to lose importance in urban dynamics, as the Art Museum, playing the role of a real pole in a metropolitan scale, has produced a concentration of functions and attractions around itself, devaluing the east part of *Broad St*.

The railway system is another great factor to be considered, when referring to the urban dynamics, as one of the main characters in some important alterations of the structure. The displacement of the political heart of the city, determined by the building of

the City Hall, had resulted in the shift of the largest commercial activities which needed a direct contact with the rail system.

This was one of the main reasons that determined the construction of the great station on *Fifteenth St*., Broad Street Station, built between 1868 and 1873. However, a direct contact with the port continued to be necessary: in fact, this originated an extension of the Pennsylvania Railroad to the area of *Dock Street*, with the construction of a new station and a new warehouse.

The last great operation was the construction, in 1886, of the Schuylkill East Side Railroad, that runs along the entire east bank of the river, and that made a fast concentration of industrial buildings just on the river walk, contributing to the "zoning" in the distribution of the functions that was already beginning to affect many parts of the city.

Reading the urban form – Current condition

The last condition that has been considered is the one referring to the current state. It is possible to imagine that the argument is too vast to be reported only to the City Center, which today represents only a small part of the whole municipality.

The intent to synthesize the urban hierarchies seems a bit forced, due to a complexity of routes and valences that should be read over the entire metropolitan scale.

However, some considerations concerning the greatest transformations that have focused on the City Center in recent years can be proposed, as they represent a fundamental testimony of the main alterations performed in the urban fabric and all those mechanisms that have certainly produced them.

Even just the identification of specialized building permits us to understand that, currently, there is no longer a more specialized route than another, furthermore, there is a complete portion extended from *Spring Garden St*. to *Spruce St.*, including the *Parkway*, which is almost totally highly specialized, with the exception of *Market St*. and *Broad St.* that continue to reinforce their importance.

It is clear, moreover, that the rail system has been mainly decentralized and transformed in underground rails, resulting in a displacement of the productive zone that is located no longer in the central part of the city but, as proposed by current planning instruments, but concentrated around *Washington Avenue* and the west area of *Broad St.* between *Spring Garden St.* and *Callowhill St.*

By comparison with the previous urban planning, it's possible to notice that a great operation of demolition has transformed mainly the north-west portion of the old plan of the city. Some of these demolitions, especially in the northern part, were followed by interventions of requalification of extensive residential buildings; others, however, especially in the area next to *Franklin Square,* were determined by a large infrastructural measure: the construction of the *Expressway*.

Preceded by a great amount of complaints and the opposition of a great part of the population, it actually represents the implementation of a real limit formed by the old *Front St.* and from Delaware, which was at the beginning imaginary.

A real disaster in the urban tissue, because the city considers already the river as a border, not only political with the New Jersey, but also visual and physical, even if the partially underground of the Interstate 95.

It's needed to emphasize once again the fate of the old *Franklin Square*, which is actually completely devoid of any urban quality and absolutely inserted within the infrastructure system, even deprived of its initial shape.

Conclusion

The outcome of the research shows the confirmation of the original hypothesis, by verifying that the Italian "Caniggia" method can also be applied to the planned city of Philadelphia. What could seem, from a non expert view, an orthogonal and undifferentiated mesh, has an internal logic dictated by spontaneous consciouness. Even the founded city, in spite of its strong intentionality of management of the anthropic set-

tlements, contains in itself a high level of inevitable spontaneous processes that have "deformed" the original plan of William Penn, ever since the first settlers arrived into the territory of Philadelphia.

References

Bacon, E.N. (2004) *Philadelphia – a new urban direction (office of the city controller city of Philadelphia)* (University of Pennsylvania Press, Philadelphia).
Caniggia, G. and Maffei G. (1979) *Lettura dell'edilizia di base* (Marsilio Editori, Venezia).
Carbonara, P. (1939) *L'Architettura in America: la civiltà nord-americana riflessa nei caratteri dei suoi edifici* (Laterza, Roma).
Condit, C.W. *American buildings: materials and techniques the first colonial settlements to the present*, American Accademy.
Dal Co, C. and Manieri - Elia, Tafuri(1973), *La città americana dalla guerra civile al New Deal* (Laterza, Roma).
Gulli R. (2006) *La costruzione coesiva, l'opera di Gustavino nell'America di fine'800* (Marsilio, Venezia).
Keels, T.H.(2007) *Forgotten Philadelphia* (Temple University Press, Philadelphia)
Philadelphia City Planning Commission (1956), *Land use in Philadelphia:(1944-1954)*.
Schade, R.S. (2008) *Philadlephia Rowhouse Manual* (Philadelphia City Planning Commission, Philadelphia).
Skaler, R.M. and Keels, T.H. (2008) *Philadelphia's Rittenhouse Square* (Arcadia Publishing, Chicago).
Siegel, A. (1975) *Philadlephia, a chronological & documentary history* (Dobbs Ferry, New York).
Strappa, G. (1995) *Unità dell'Organismo Architettonico* (Edizioni Dedalo, Bari).
Gallery, J.A. (1999) *Philadelphia Architecture – A guide to the city* (MIT Press, Massachusetts).
Strappa, G. and Ieva M. and Dimatteo M.A. (2003) *La città come organismo. Lettura di Trani alle diverse scale* (Adda, Bari).
Strappa, G. (2014) *L'architettura come processo. Il mondo plastico murario in divenire* (Franco Angeli, Milano).
Tafuri, M. and Dal Co, F. (1992) *Architettura contemporanea* (Electa, Milano).
Swift, M.(1998), *Historical maps of the United States* (PRC Publishing Ltd, London).
Tagliaventi, G. and Bucci, A. (2006) *From slub - urbia to the city, qua¬derni di A&C international documents 5* (Alinea editrice, Firenze).
Wolf, E. (1992) *Philadelphia, portait o fan american city – 2nd edition* (Stackpole Books, Philadelphia).

A Typomorphological Approach:Study on Village Morphology in the South of Jiangsu Area, China

Wowo Ding, Qian Li
School of Architecture and Urban Planning, Nanjing University
Keywords: typo-morphology, generation process, local culture, natrual factors

Abstract

As a method the typo-morphology has played an important role in Italian School developed by Muratori and Caniggia. The significance of this approach is that urban form can be described by detailed classifications of buildings and open space, through both typological and morphological deriving from studies of typical spaces and structures. Following typological thinking the typo-morphology could be translated into an operative tool by using buildings, routes (streets) and plot-series (blocks), which helps to bridge the gaps between morphological knowledge and design practice. Grown in nature the morphology of villages most clearly presents the patterns with both human culture and infrastructures of social development, so that through typo-morphological analysis of the natural villages one could understand the importance of the local culture, life style, and the natural topography in village generation, even during the modern social development. The research raises a question to the new type of village planning and housing design borrowed from the city or 'villa' contemporary happened in China, and suggests how to learn from natural structure.

In order to reach our goal two villages were selected in southern Jiangsu province, flat area with rich river network, as study cases. Based on the field works, our research investigated the village's generation process from 1949-2012, and housing samples and their typological transformation by the time. Three categories factors were studied: housing types, building placement, and geographic elements, such as water (river), farm fields and roads. This paper will clear display two results: first how village's form transformed in the force of social development. Second, what kept unchanged during social development.

Introduction

Recently, the most architects and urban designers gradually realized that urban design creation requires more understanding urban generating process, rational urban morphologic analysis and study. For urban designers facing different tasks with the architectural design, the methodology of urban design should bases on urban generation theories, that knowledge of urban morphology is indispensable. However, to understand urban morphology is not enough for making urban design, they need to turn morphologic knowledge into the design morphology, which is the main purpose for the urban designers involved in urban morphology research. This paper attempted to test how to determine operable morphologic elements for urban design through morphologic study. To reach our goal, two natural villages were selected in southern Jiangsu province, which morphology of villages most clearly presents the patterns with both human culture and infrastructures of development. The ideal is that through morphological analysis one could understand how the local culture, life style, and the natural topography played the roles in village generation, even during the modern social development. The result could become the crucial criticizes to the issue of the new type of planed villages and housing design borrowed from the city or 'villa' contemporary happened in China, and suggests doing the things based on its original.

In the beginning of morphological analysing, we have to define where we stand among various morphologic schools, terms and method which need to relate to the knowledge of design methodology. Marshall (2011) have set very clear division between urban morphology and design: "separate hemispheres of the brain", he suggested that urban morphological analysis should be tailored more towards the kinds of abstraction that are most useful for designers to use in practice, from designer's view such abstraction is "Type". In design field, normally typology can be seen as methodology guiding problem solving, since each type is tied closely to a class of problems in the reality, thereby that morphologic abstraction to a kind of typology might be a way of forming urban design theory. Since urban morphology could be called as the urban tissue (Kropf, 1996), a physical entity, the urban tissue is not only identifiable object for urban morphological research, but also understood as objects by urban design. Based on Caniggia's School the term 'typomorphology' was proposed (Moudon, 1994; Kropf, 1996, 2006; Samuels, 2008), especially Moudon. She pointed out: that "typomorphological studies reveal the physical and spatial structure of cities. They are typological and morphological because they describe urban form (morphology) based on detailed classifications of building and open spaces by type (typology)." It well opened up that typomorphology is the study of urban form derived from studies of typical spaces and structures, which borrows the concept "type" to characterize urban form, its buildings, and open spaces in between. As a method the typo-morphology has played an important role in Italian School developed by Muratori and Caniggia, who accounts typo-morphology as an "operational history of urban form" and a record of actions taken by planners, designers, and builders (Moudon, 1994). The significance of this approach is that urban form can be described by detailed classifications of buildings and open space, through both typological and morphological deriving from studies of typical spaces and structures. Following typological thinking the typo-morphology could be translated into an operative tool by using buildings, routes (streets) and plot-series (blocks), which helps to bridge the gaps between morphological knowledge and design methodology.

In typo-morphologic study, the typological process and the notion of type are the cores. Muratorian type emphasized and delimited the role of social factors in the creation of types and in their transmutation. It stresses that typological transformation could be examined through a theory of built forms – a morphology – concurrently with a theory of practice (Gauthier, 2005). In the other hand, once the 'typological process' is considerate, it is necessary to exam another similar term- 'morphological period' based on Conzenian School, for each morphological period is characterized by the widespread introduction of new forms with types of street layout, building types, and architectural styles. These new forms are then reproduced over variable amounts of time before being succeeded by different predominant forms in the next morphological period (Whitehand et al., 2014). Jeremy W. R. Whitehand, together with his colleague, had made significant contribution on a comparative

study between two terms: 'typological process' and 'morphologic period', pointed out that 'precise nature of the typological process remains elusive. There is generally a recognizable developmental sequence from one morphological period to the next is evident in their study areas,' so that 'morphological periods are much more readily accessible to empirical study, being based on a comparison between what is dominant within them and what had been dominant in the preceding period. Some of the differences between morphological periods are clearer cut than others (Whitehand et al., 2014).This study reminds us defining 'type' is crucial question, which should be put in the first place in our work.

Further more, the term 'type', as introduced particularly by German architects, was ideologically essential for architecture to function and had become part of architectural design in the INS-Casa housing districts built after the war (Giancarlo Cataldi,2003). The notion of type has been deeply rooted in the architectural history: Quartemere de Quincy, Abbe Laugier, and Durand were the first to experiment with architectural type, and the late, Aldo Rossi's 'architecture of city'. Rossi's work is well known in the architectural field, for Rossi the type is an act of composition based on the search for ideal and absolute forms. Differently, Muratori is concerned type with the 'construction' of the city. In Muratorian theory, type is both a synthesizing concept a priori and a real organism, linked to a specific time, or historical moment, and place (Giancarlo Cataldi,2003). In this aspect, type is not only building extraction but also an internal structure, the generating principle of a process, and a collective creation and expression. Previous research provides wide possibility to set the essence of the 'type', which led us go beyond traditional architectural typology definition in typo-morphologic study.

Based on the field works, our work investigated the villages within broad South of Jiangsu Province, surveying housing types from 1949-2014, the housing setting regularities, the village morphological structure and natural topography. After literature review and field investigation we clarified the housing types with their generation process as fundamental materials at first. In light of typo-morphological research we used 'type' to study a village's morphological structures, plots pattern/ and housing texture and characteristics. During the research we have to try both concepts of 'type' and 'typomorphological process', and to understand a village's formation and its generating mechanism. Finally the paper draws the outline of the village's morphological structure in this area, the block distribution and division regularity, and the role of hosing types.

Housing Typology Investigation

Related research areas

Study cases are selected in the south of the Jiangsu Province,China. Jiangsu province is located in the centre of the eastern coastal line of China in the lower reaches of the Yangtze River and the Huaihe River, in the transitional area between subtropical and warm temperate zones. Its climate features four seasons with substantial changes in temperature from the cold season to the hot one. The Jiangsu province has an area of 102,600 square kilometers, mainly in plain with a dense network of water systems and lakes. To the south of the Yangtze River lies the Qiantang River. At the estuary of both rivers, the famous Yangtze River Delta has formed through years of silting and deposition. The whole of Southern Jiangsu Province is situated on this delta.

In recent years, concerning the research subjects in relation to villages in the south of Jiangsu area, several scholars have carried out investigations, for example, in Suzhou area, Wuxi area, Changzhou area, Zhenjiang area and Zhangjiagang area (Xu et al., 1991; Duan et al., 2015;Ding et al., 2015; Han et al., 2015; Ding,2001). The researches provide abundant cases for this article. Combined with village investigation conducted by the writer in recent years, we draw the plans of basic types for residential houses in the south of Jiangsu(Figure 1a). Under the framework of basic types, due to the difference of construction time and economic conditions, several forms of evolution have also occured to the rural residence.

Basic types and generation plans

Ancient folk houses (built before the foundation of the P.R.C.) use timber structure as their load-bearing system. The basic unit of folk houses is "Jian (room)". The buildings ar-

ranged along a longitudinal axis in ancient folk houses form "Luo". Transverse building and frontal courtyard comprise "Jin". The longitudinal series connection of multiple "Jin" enclosed by high walls comprises courtyard houses, which is the common one-Luo and multi-Jin housing type(type A in Figure 1b). The larger residence can also have transverse combination to form multi-Luo and multi-Jin plan layout.

After the foundation of new China, these big courtyard houses were mostly allocated to poor farmers to be shared by multiple households. In the beginning, their original pattern could still be maintained, and the rural houses still maintained their three-bay layout with entrance from the main hall and one room respectively on the left and on the right(type B in Figure 1b). In the 1960s and 1970s, with the increase of village population, the residential renovation and expansion also increased. Due to the impacts of a large population, little land resources, and the production system and economic level at that time, the renovation of village houses was mainly limited to the renovation of old houses by increasing premise depth with the three-bay five-room plan(type C in Figure 1b). The plan type with two bays(type C1 in Figure 1b) and three-room one wing-room(type C2 in Figure 1b) making full use of homestead is also found.

The construction of large amounts of village houses generally went through two stages: the first stage was in the early 1980s when tile-roofed houses were reconstructed into storied houses. At this stage, the house construction was mainly motivated by the improvement of living conditions, and most newly constructed storied houses were of brick-concrete structure with a corridor downstairs and balcony upstairs. The second stage was in the 1990s when the functional layout of renovated village houses started to get close to urban living styles. The width of a bay is between 3m and 4.5m and the total face width is normally around 12m. But the method of room arrangements always inherits the living mode of traditional village houses centered at the main hall, which is to directly enter a hall similar to the "main hall" through the entrance door and then to arrive at different rooms from there(type D in Figure 1b).

After 2000, with urbanization development, more and more young people have started to buy commodity houses in cities/towns for dwelling, and accordingly the construction of rural houses in villages has dramatically decreased. The layout of very few rural houses has completely followed the requirements of urban life during renovation with complete living room, kitchen and toilet. Actual needs are also considered without blind area increase(type E in Figure 1b).

Changing points: Size, Level, Material

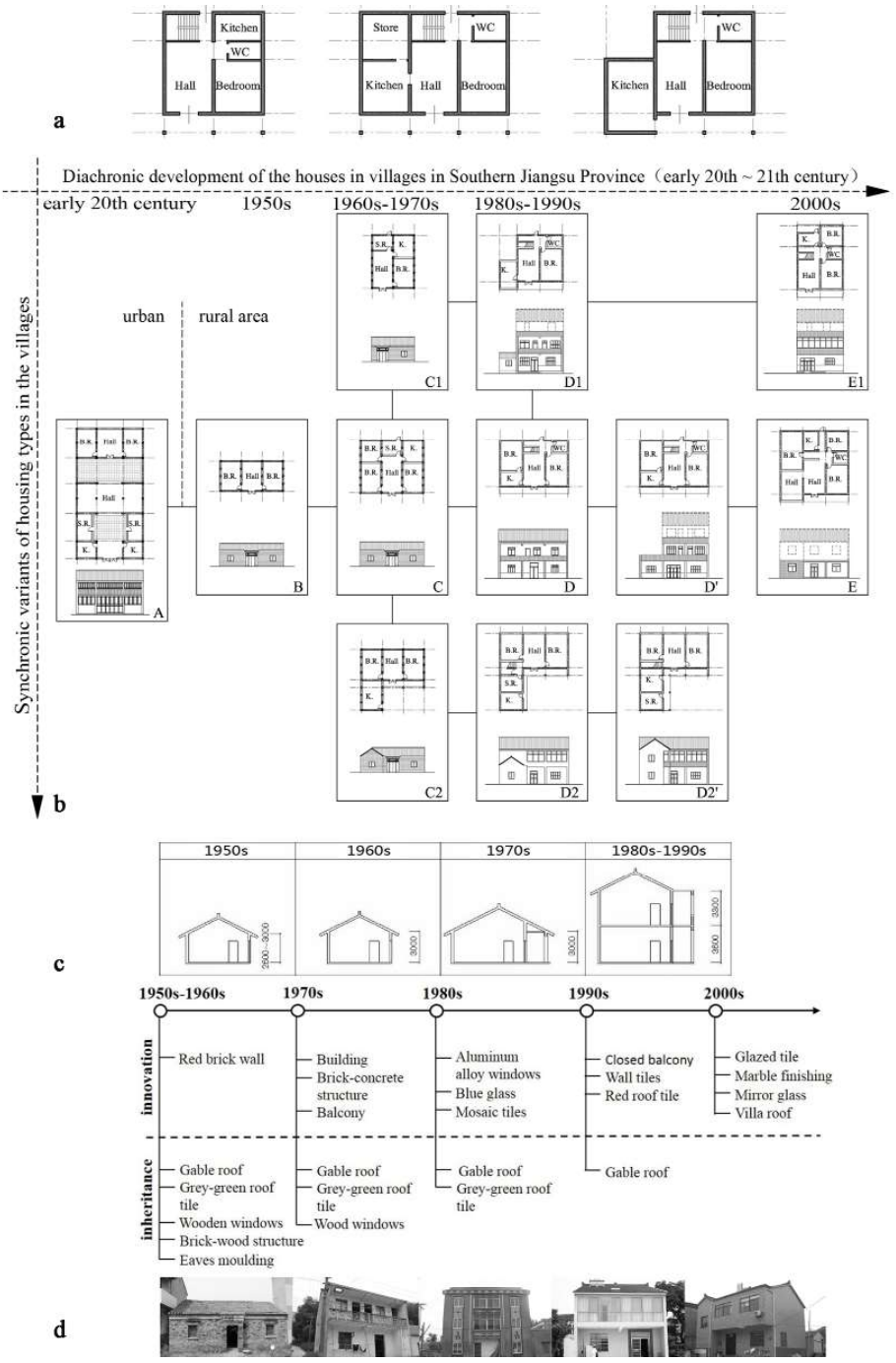
For a single rural house, its size first decreased, then increased and finally reached a stable status. In terms of building height, it changed from single-story house to two- to three-story buildings(Figure 1c). However, as for specific space for use, since there is no major change of living style, the rural houses still continue the traditional bay size. Even the structure has been changed and the bay has not been expanded too much. A size sufficient for use would work. However, when tracing back to the changes of materials and patterns for village houses, we found that the change of time has diversified construction materials and patterns. When new materials are introduced from cities to Chinese towns and villages, the traditional village houses would inevitably change(Figure 1d).

It should be emphasized that the features of rural houses in southern Jiangsu Province have a direct relationship with the culture in southern Jiangsu Province, that is, on the one hand, the style of simpleness and elegance is advocated, while on the other hand, it is open to accept new things. The new construction materials in the cities will appear on newly built village houses in one or two years. The only thing remaining unchanged is their sloping roof and the ridge decoration on the roof.

Type and Typomorphological Process

Tangshu is situated in Jintan City, neighboring Changdang Lake in the west which features rich aquatic products. Aquaculture is the major sideline. Tangshu Village has a history of more than 1500 years. Its overall layout combines topographic and natural con-

Figure 1. Housing typology: (a) Basic types of rural houses; (b) Reconstruction of typological process in villages; (c) The development of farmhouse height (source: Ding,2001,p.103,Fig.3-14);(d) The table and photographs show changes of materials and patterns of rural houses



ditions. One main road goes through the whole village from east to west and goes out of the village from the northwestern corner. The investigated area is located to the south of main road, which extends all the way along the secondary road in the village until the pond in the very southern end of Tangshu Village(Figure 2a). Tangshu is limited by local landforms and has fewer road networks connecting the outside. In terms of morphology, the village gradually expands to both sides of south and north relying on the main road, but always maintains relatively stable status.

Besides field survey of each rural house and homestead and villagers' interview, we also found the current head of the village, whose family lived here for generations. He told us the three existing ponds in the middle of investigated area were old ponds. The area to the south of the ponds used to be a piece of farmland. The village gradually expanded southwards only with the population growth in the 1970s, which is fully consistent with our investigation findings.

Evolution and Topographical Structure

The evolution of Tangshu is the siting and construction of new houses by villagers on available land again and again with time passing by(Figure 2b-2c). According to the age of each house, we have drawn the maps since the 1960s, one map for each decade (Figure 3). On each map, rural residences devleoped in chronological order (except accessory buildings), and the situation of plots were gradually increasing. The roads slowly extend southwards; meanwhile, with the houses increasing, branch roads are generated inside blocks. The siting of houses fully considers the geographical environment in the village.In the 1960s, the siting of rural houses was close to the main road, facing ponds and farmland in the south and avoiding the low-lying land in the west. In the late 1970s, the rural houses started to be scattered in the farmland in the south. In the 1980s, the peak of rural house construction also appeared in Tangshu Village, and the farmland in the south no longer exists. Except the areas beside the ponds, the areas along the roads and the villagers' own contracted farmland could both be preferred for house construction. The villagers can make their own choices for appropriate locations of new house construction, either just neighboring old houses or in another new location. In the approval of homesteads, the village government only controls quantitative indicators. With the increase of houses, new branches grew inside the groups. In the 1990s, the structure and construction technology for rural houses got more mature, at the same time, there was less and less land available for construction in the village. The ponds were partly filled up into homestead, and rural houses were also built in the low-lying area in the west. After 2000, same as various villages in the southern Jiangsu Province, the construction quantity of rural houses in Tangshu Village significantly decreased. During this period, new houses do not select new locations for construction, and were mostly renovated on the homestead of old houses. Tangshu Village always keeps traditional characteristics of being surrounded by large pieces of farmland and ponds. Except for significant expansion of village size, the village layout has no major change, which keeps locally traditional natural landscape features to some extent.

Community culture and value

In addition to the environmental elements, the awareness and values of the community also contribute to the generation process. The water determines the orientation of the house and the built environmental factors are concerned with selecting dwelling places. They express the relations between the people and the environment. The villagers have a very concrete understanding of environmental space. Only when they are in it, there is a value to consider "at this time and place" (Wang,1997).Moreover, a tradional village is the outcome of living together, and the result of relations between houses. In our investigation, we found that the combination of houses fully reflect the social relations between people. To build a house close to the neighour ,roughly sharing the environmental space need first to be agreed upon, and then the positional relations with the existing houses are taken into account.

Since 1980s, there have been totally 26 houses built wiithin the investigation scope. These houses were bult with constructed rural residence around(Figure 4a).We analyzed the siting of these 26 houses one by one and found three main principles for siting as below: 1, No southward shielding. Among others, 23 houses have the spacing of more than 9m from the southern buildings; only 3 houses are exceptional(Figure 4b). The site of H-04 just neighbors the old one, since there are already buildings to its south, the new house was changed to the east-west orientation; H-09 is to the south of the old one. Since it is only used for auxiliary functions such as kitchen and storage room, while the main hall and the bedrooms are still in the old house, the sunlight issue hasn't been considered for

Figure 2. Research area and housing typology: (a) The boundry of research area; (b)Changes of floor plans; (c) Photographs show changes of materials and patterns of rural houses in Tangshu village

new houses; H-07 was built in 2011, when there was almost no land available in the village, so the new house can only be built by demolishing part of the old house, and the southward shielding is inevitable. The sunlight issue can only be mitigated by increasing the building height.2, Orientation must be consistent. The rural houses built before the 1970s are all located around the ponds. Although their arrangements are loose, their orientations are generally consistent. All the 26 rural houses built since the 1980s keep the orientations consistent with surrounding old houses during building. 3, No eastward overstepping. Statistical analysis has been conducted by use on the relationship between new and old houses, and we find that if a new house is constructed to the east of the old one, then the new house will not overstep the old one in the south. The exception is that the old house belongs to the same owner, and has been directly combined with the new house as a whole (Figure 4b,H-04, H-14).

Thus it shows that, for the morphological organization structure of Tangshu Village, its original morphological structure was firstly determined by the structure of water system; and the

Figure 3. Research area plans of Tangshu,1960s-2000s, based on authors'field survey

Figure 4. Housing setting regularities: (a) Twenty-six houses built after 1980; (b) Four houses are exceptional, based on authors'field survey

trend of water body boundaries determine the orientation of houses in the village. The siting of rural houses reflects locally characteristic community culture and value orientation – focusing on sunshine conditions for residence without blocking sunlight of the neighbors, and maintaining countraposition relationship with surrounding houses as far as possible.The form of new houses is determined by their types. Right after the underlying homestead is decided, the private plot is then decided. With continuous increase of rural houses, new roads gradually develop inside the village, and the village size keeps increasing.

Conclusion

Typomorphology combines the advantages for the two theories of morphology and typology. And "typomorphological studies", a term coined by Italian architect Aymonino, has become an important tool to analyze and understand the physical form of cities and the process of accumulating of human habitats, which is useful in understanding the three dimensional structure of the city and its underlying formation process. Firstly, typomorphological method can also be used to study the growth and evolution of villages. By reviewing academic works and survey data related to the villages in the south of Jiangsu in recent years, the article summaries the evolution of building types for rural residence in the south of Jiangsu (in particular, after the foundation of new China) and the generation process of village is reviewed based on this. It is shown that with the evolution of rural building types at different times, plots and roads have inevitably changed accordingly, which has thus resulted in the generation and evolution of the whole village structure.

Secondly, the morphological characterisitics integrating natural and cultural environment is the foundation of village morphological characteristics. The house types changing with time have not resulted in any foundamental impact on the villages. The morphol-

ogy of the villages planned in 1980s covered by the writer's investigation, is completely differnt from a natrul village, but there is no innovation for its building types. It is shown that only to stress the interest in housing typology is not enough to the study of processes leading to the formation and transformation of the villages.We should explain the morphological structure,which is the key factor to the evolution of the natrual villages. Built environment is treated as one constantly changing in the hands of people living and using it,what kept unchanged should be taken account by designers.

References

Cataldi, G., Maffei, L. G., Vaccaro, P. (2002) 'Saverio Muratori and the Italian school of planning typology', *Urban Morphology*, Vol. 6 (1), 3- 14.

Cataldi,G. (2003) 'From Muratori to Caniggia: the origins and development of the Italian school of design typology, *Urban Morphology*, Vol. 7 (1), 19-34

Ding, W.W.(2001) *The generation of a village—the study of villages in the ZJG region* (ETH University Press, Zurich).

Ding,W.W., Ji,G.H., Hua,X.N. and Li,Q.(2015) *Jiangsu rural human settlement environment survey:Changzhou* (The Commercial Press, Beijing).

Duan,j., Zhang,G.Q. and Xue,S.(2015) *Jiangsu rural human settlement environment survey:Wuxi* (The Commercial Press, Beijing).

Gauthier, P. (2005) 'Conceptualizing the social construction of urban and architectural form through the typological process', *Urban Morphology*, Vol. 9 (2), 83- 93.

Hall, A. C. (1997) 'Dealing with incremental change: An application of urban morphology to design control', *Journal of Urban Design*, 2:3, 221-239.

Han,D.Q. and Wang,E.Q.(2015) *Jiangsu rural human settlement environment survey:Zhenjiang* (The Commercial Press, Beijing).

Kropf, K. (1993) 'An enquiry into the definition of built form in urban morphology', unpublished PhD thesis, University of Birmingham, UK.

Kropf, K. (1996) 'Urban tissue and the character of towns', *Urban Design International* 1(3), 247-263.

Kropf, K. (1996) 'An alternative approach to zoning in France: Typology, historical character and development control', *European Planning Studies* 4(6),717-737.

Kropf, K. (2001) 'Conceptions of change in the built environment', *Urban Morphology*, Vol. 5 (1), 29-42

Kropf, K. (2006) 'Crisis in the typological process and the language of innovation and tradition',*Urban Morphology* 10, 70-73

Maretto, M. (2005) 'Urban morphology as a basis for urban design: the project for the Isola dei Cantieri in Chioggia', *Urban Morphology*, Vol. 9 (1), 29- 44.

Marshall, S., and Çalişkan, O. (2011). 'A joint framework for urban morphology and design'. *Built Environment*, 37(4), 409-426.

Menghini,A.B. (2002) 'The city as form and structure: the urban project in Italy from the 1920s to the 1980s', *Urban Morphology*, Vol. 6 (2), 75-86

Moudon, A. V. (1992) 'A Catholic Approach to Organizing What Urban Designers Should Know', *Journal of Planning Literature* 6(4), 331-49.

Moudon, A. V. (1994) 'Getting to know the built landscape: typomorphology', in Franck, K. and Scheekloth, L. (ed.) *Ordering space: types in architecture and design* (Van Norstrand Reinhold,New York) 289-311.

Samuels, I. (2008) 'Typomorphology and urban design practice', *Urban Morphology* 12, 58-62.

Wang.M.M.(1997)*Culture and power as seen in villages—five thesis on three villages in Mintai* (Shenghuo-Dushu-Xinzhi Joint Publishing Company Press,Beijing).

Whitehand, J.W.R., Gu, K., Conzen, M. P., Whitehand, S. M. (2014) 'The typological process and the morphological period: a cross-cultural assessment', *Environment and Planning B: Planning and Design* 41, 512 – 533.

Xu,M.S., Zhan,Y.W., Liang,Z.Y., Ren,H.K. and Shao,Q.(1991) *Residential houses in Suzhou* (China Building Industry Press, Beijing).

The evolution of Chinese urban morphology under the influence of mega-events (1865 - 1927)——A case study of Nanking

Han Lu, Jin Duan
Southeast University, Nanking, China
Keywords: urban morphology, mega-events, Nanking

Abstract

The evolution of Chinese city has been widely discussed in the last few years. Researchers expressed their opinions in different ways and formed various perspectives, such as geography, transportation, architecture and so on. However, few studies focused on spatial analysis related to morphological variation, especially in the context of urban self-organization and hetero-organization. In this case, this paper attempts to analyze the morphological evolution based on the influence of mega-events.

Example is carefully selected to meet the requirement of this special perspective. Nanking was established 2,500 years ago, which was made capital in ten dynasties. In this paper, we will focus on a very special period in its history, which starts from 1865 to 1949. It can be divided into four sections.

(1) 1865-1927. We all know that, in 1861, westernization movement was started, which accelerated the progress of China's modernization. In 1865, Jinling Manufacture General Bureau was set up, which meant that Nanking's industry had begun to enter a starting and slowly growth stage of development. Instead of carriage, automobile gradually became the major vehicle during that time.

(2) 1927-1937. In 1927, the national government chose Nanking as its capital. And the following ten years were known as 'Golden Decade' in the history of Nanking's urban planning and construction. In 1929, <The city plan of NANKING> was published, which was the first formal urban master planning of this city. It changed the original morphology and laid the foundation for the coming development of urban morphology.

(3) 1937-1945. The prosperous progress was disturbed by the Sino-Japanese war for eight years. Urban construction was forced to stop in this period. Parts of the city were damaged in the war or used for military purposes.

(4) 1945-1949. In 1945, local government tried to regenerate the city, however, due to the civil war, the construction speed is quite slowly. In 1949, People's Republic of China was established.

This paper not only concerns the morphology of the whole city, but also pays attention to some specific space at local scale, whose morphology was changed directly by mega-events. We try to find out how does the space deal with sudden change, and integrate itself to the surrounding again or what adjustment other space have to make to adapt to the sudden change. At the end, we try to sum up a kind of intermediate urban morphology formed by both self-organization and hetero-organization.

Introduction

It has been nearly 2500 years from Fan Li (The Minister prime of Yue state) establishing Yue city beside Qinghuaihe river in 472 BC. Nanking had been the capital of Six Dynasties, which included the Soochow Dynasty, the Eastern Jin Dynasty, the Southern Dynasties of song, Qi Dynasty, Liang Dynasty and Chen Dynasty. In addition, She was taken as the capital for a while during the period of Tang Dynasty, Hongwu of the Mnig Dynasty, Taiping Heavenly Kingdom and Kuomintang government. In this condition, Nanking is seen as the crystallization of China's feudal society civilization.

Nanking is located in the lower reaches of the Yangtze River, which is very important to the Yangtze River waterway. Due to its advantageous geographic location, it had always been a town of great military importance.In the early Qing Dynasty, Nanking also was the economic centre of southern China, the second large metropolitan after Peking. With the outbreak of the Opium War, the booming situation was broken. From the late of Ming Dynasty to the founding of Nanjing National Government, less than 100 years, Nanking had experienced several times of the scourge of war and the transfer of governments.

On the other side, along with the abrogation of the policy of seclusion, people got a chance to know the modern idea, western culture and advanced technology. It promoted Nanking to get into a transformation period and achieve the modernization in the end.

In a word, the morphology development of Nanking in this time is slowly, complicated but meaningful.

Regime alternation

After Opium War (1842), the imperialist powers repeatedly forced the Qing government to cede territory, pay indemnities and open trade. The policy of isolation ended and the Qing dynasty had to open its closed door to the outside world. From that time on, China was looked a semi-colonial and semi-feudal country and became a supply land for the aggression countries. Worse, under the influence of western idea and culture, Xiuquan Hong launched the Taiping Rebellion in 1851 and occupied Nanking in 1853 and changed its name from Jiangning to Tianjing.

After the second Opium War (1856), the Qing dynasty was forced to sign 'Tianjin treaty'. Under the aconverging attack between Taiping Army and Intrusion forces, the Qing dynasty tried to use 'Westernization Movement' keep the dominate of Qing dynasty. In 1864, Qing army recaptured Jiangning(Nanking), the Taiping Rebellion failed.

In the early 20th century, bourgeoisie, petty bourgeoisie, intellectuals and other oppressed class began to resist the rule of Qing dynasty. In the end, the Revolution of 1911 overthrew the Qing monarchy. The Republic of China was born in the next year. But only three months later, Zhongshan Sun was forced to resign. Tangled warfare breaks out among warlords (Table 1).

Table1. Historical Evolution of Nanking (1368-1949)

Dynasty		Capital	Name of City	Memo
Ming	1368-1644	Yingtian Prefect (1368-1420)	Nanking; Yingtian Prefect; Shangyuan County, Jiangning County, Lishui County, Jiangpu County, Liuhe County, Gaochun County	
Qing	1644-1911		Jiangning Prefect; Shangyuan County, Jiangning County, Lishui County, Jiangpu County, Liuhe County, Gaochun County; Tianjing	1.1853-1864 Taiping Heavenly Kingdom found a capital in Nanking, named 'Tianjing' 2.1840-1842 Opium War Western powers intrude into China 3. 1856-1860 The second Opium War, Tianjing treaty,
Republic of China	1912-1949	Nanking (1912) Nanking (1927-1949)	Nanking Prefect; Jingling Road; Jiangning County, Jiangpu County, Liuhe County, Gaochun Ccounty, Lishui County, Nanking City, Capital City	1937-1945, Japanese Aggressive War, Nanking is the location of Wang Puppet Regime,

Population

Nanking city was break by Qing Dynasty army and Taiping army in 1853 and 1864. Especially for the second time, the Qing Dynasty army killed people without any constraint, which caused a huge damage to the Nanking city. According to the records, there are 900 thousands people in Nanking city in 1853. The population reduced greatly after the war. It began to rise until 1866, because that some residents in the north of Jiangsu province moved to Nanking to avoid the flood and some original residents gradually returned home. By 1893, urban population got to 200 thousands. The majority of them were not indigenous but moved in from other places. In 1901, the urban population rose to 225 thousands, and increased year by year. We can see that, it is 230 thousands in 1910 and 269 thousands in 1912. The increase of commercial and industrial population in modern times has changed the population structure of Nanking, and the attraction of the emerging industry had become the main factor that caused the growth and the flow of the urban population. (Table 2)

Table2. Urban population of Nanking city in modern times

Year	Num	Year	Num
1853	900000	1917	377549
1893	200000	1918	376291
1901	225000	1919	392100
1906	400000	1920	392100
1910	230000	1921	380200
1911	267000	1922	380900
1912	269000	1923	401500
1913	269000	1924	395500
1914	377120	1925	395500
1915	368800	1926	395500
1916	378200	1927	360550

Economics

During Ming and Qing times, Nanking's industry and commerce developed rapidly. The market was prosperous. During that time, silk industry has been looked as the pillar section in handicraft industry. The traditional silk fabric was the major commodity in market. After the Opium War, economic model undergone a huge change, that foreign goods began to access into market. After the outbreak of the Taiping Heavenly Kingdom war, merchants began to withdrew money and moved to Shanghai. When the Taiping army occupied Nanking, they confiscated private property, executed rationing and forbidden business and private companies. They set up a trading street (commercial area) outside the city. The commodity trading there was prosperous, and some of the streets became a large urban market. After the failure of the Taiping Heavenly Kingdom, the Qing dynasty army began to burn the whole city, that made Nanking suffer heavy losses. At the same time, Shanghai was opened as a trading port. The status of Shanghai began to rise, in this case, the economic gravity began to move to towards east. The position of Nanking as economic core and an important trading port in south of the Yangtze River no longer existed. After the Qing Dynasty army recaptured her in 1864, due to the support of Westernization Movement, opening commercial port of Xiaguan and the improvement of traffic status, the ancient district in Nanking city had grown up rapidly, which laid a strong foundation for Nanking's modern development. We can say that, the westernization movement provided a good opportunity for the development of Nanking. Led by Hongzhang Li, from the 1860s a number of industrial factories, especially military factories, were established, such as Jinling manufacturing bureau.

Mega-events
Westernization Movement

In 1864, Taiping rebellion was put down by Qing Dynasty army. In spite of this, the Qing Government was drifting towards bankruptcy after facing the troubles at home and aggression from abroad (Taiping Rebellion and The second Opium War). In order to save the dynasty which was on the way out, the Qing government realized that they have to do something right now. In this condition, the late Qing dynasty began to push the policies, called 'Westernization Movement', which means development based on Traditional Chinese Values and aided with Modern Western Management and Technology. We can say that, the westernization movement is the first step of the modernization under the guidance of the "Chinese-style Westernization" concept and is managed the late Qing Dynasty. In the same year, Hongzhang Li (Figure 1), who is a member of 'westernization movement' group was named the Governor General of Jiangnan and Jiangxi Provinces. Suzhou artillery Bureau was moved to Nanking as well. In 1868, Mr Li built Jingling Machine Office (Figure 2) outside the 'Ju-bao-men' road, which opened the way to the Modern Industry of Nanking and was looked as the beginning of Nanking's Modernization. Since then, some government-defense industry enterprises (Gunpowder Bureau, Mine Bureau, Navy shipyard, etc.) and private industrial enterprises (Yong-yao electric lamp factory, Yang-yong-xing Machine Building Plant, Tong-tai-yong iron foundry, etc.) were set up one after another, which lay the foundation of Nanking's modern industry and advanced the development of other related industry, such as services and commerce and traffic. So the structure of industry in Nanking began to make the transition.

Open the commercial port in Nanking

In Sino-French treaties of Tientsin (1858), Nanking was first opened for trade. But due to the interference of Taiping rebellion, this policy couldn't put into practice in time. In 1871, the local government tried to set up Merchants Steamship Company. Then, a simple pier was built for the guest at the district of Xiaguan, which spur the development of this area.

In 1894, the first street serviced for inrick-shaw and carriage in Nanking, called 'Jiangning road', was established. It started from the riverside in the area of Xiaguan, and went into the city through the gate of 'Feng-yi' and passed through the Drum Towers, the southern foot of Ji-long mountain, Stele Pavilion lane, finally got to the gate of 'Tong-ji'. In

Figure 1. Hongzhang Li
Figure 2. Jingling Machine Office

1899, Nanking was official opened as a commercial port, a lot of foreign firms, churches and educational institutions were set up in this area. Only in 1905, the local government had built up five roads in this area. Additionally, Shanhai-Nanking railway, built up in 1908, and Tientsin-Pukow railway, built up in 1912, intersected to each other in Nanking, which gave a chance for Nanking's commercial industry on overland as well.

In 1910, based on other successful example of international exhibition, the local government held Nanking hypothec exhibition for nearly six months, which attracted tens of thousands of people to take part in. The turnover reached nearly ten million rmb. We can say that the exhibition achieve its original purpose, it did give a strong boost to the commercial development.

In sum, the war between Qing army and Taiping army destroyed the physical space and financial system of Nanking, bring a heavy loss to her. There no doubt that Westernization Movement brought the dying city back to life a little bit. Led by Hongzhang Li, modern industry came into its own. Under the background of opening commercial port, construction of Shanhai-Nanking railway and Tientsin-Pukow railway, Xiaguan area was in a vigorous development. Lots of commercial and residential area appeared in this district during this time. In addition, Jiangning road linked Xiaguan area and mian city together. Thus it can be see that Westernization Movement and the opening of Xiaguan port played a vital in the recover of the city.

Analysis on the urban morphology

Due to the Westernization Movement and opening commercial port, the characteristic of Nanking was changed from Agricultural city to Industrial city. The variation of urban nature and function also led to the evolution to Nanking's morphology. In sum, it mainly focused on the followings.

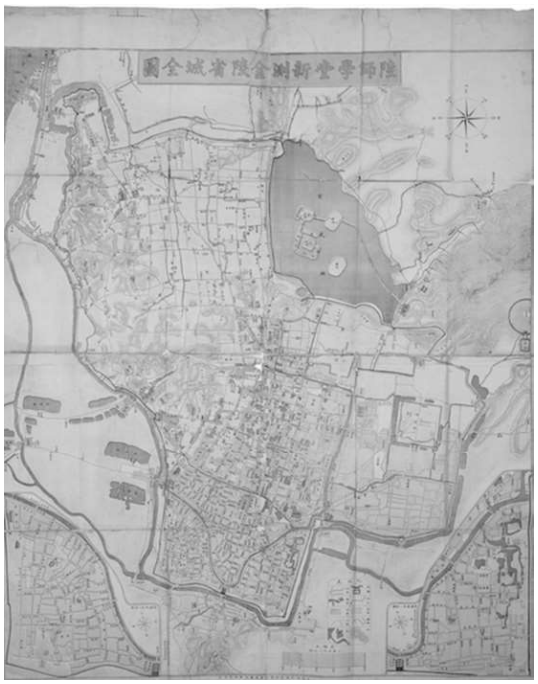
The district in the south of the old town

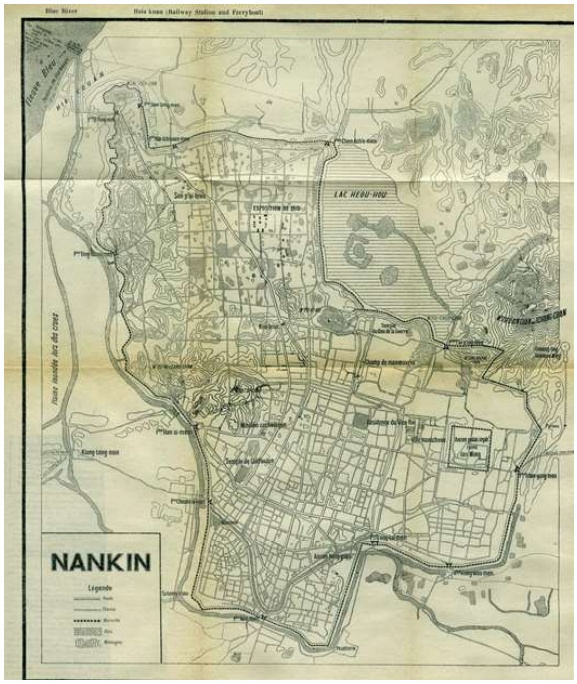
The Westernization Movement promoted the development of modern industry in Nanking. After the establishment of the Jinling machine Bureau in 1865, Military industry and Private industry had been well developed. A lot of factories were built up during this period. They mostly were located at the southern area of Nanking city. From Figure 3, we can see that, the industrial lands were distributed outside the core town along the moat river, which were separated from the residential lands inside town.

The district of Xiaguan

In 1895, Xiaguan road and Huimin bridge were built in Xiaguan area, to some extent, which increased the connection between Xiaguan and the area inside the city wall. We can say that, before Nanking opening as a commercial port, the number of travellers in Xiaguan had increased quickly. During this time, a lot of service and entertainment industry emerged, such as hotel, theater, shop and so on. In 1899, under the oppression of the Western forces, Nanking was opened for trading port and Xiaguan was chosen as the port location. In order to develop the shipping business, foreign merchants tried their best to seize the most favorable position. They set up commercial enterprises, built up dock and basic facilities. At the same time, in order to prevent the foreign people going to the town Qing government began to take action to improve the living and transport conditions of this area. With the increase of traffic volume, Yan-jiang road, Da-ma-lu road, Er-ma-lu road and Shang-bu-jie road were built between 1900 and 1903. Several bridges were set upon the Huimin river as well. In 1908, Ning-sheng railway was completed, which run inside the city from northern area to the southern area. Then, Shanghai-Nanking railway and Tianjin-Nanking railway were opened to traffic in 1908 and 1912. In this context, the situation, that Nanking was taken as the transport hub on both on water and land became more and more obvious. The subsequent development in import entry, transportation and other related business was growing fast as well. In addition, telegraph office and post office were

Figure 3. Map of Nanking city in 1910
Figure 4. Map of Nanking city in 1912





1376 built up in this area. More and more passenger and freight were transported here. All of these provided a good condition to the development of Xiaguan area.

Data showed that since 1912, the number of the western style architecture and commercial firm were in large quantity. Although the useful geographical area was no more than a hundred acres, the population was more than 15000. The busiest place was beside Huimin river, including Shandiao road, Xianyu lane, Yongning road, Damalu road, Ermalu road and so on. And during that time, some banks were opened in some of them (figure 4).

The district between Xiaguan and old town

Along with the prosperity of Xiaguan and its increasingly prominent role, after the opening of the Nanking-Shanghai railway, the governor applied to built another railway, which was called Ningsheng railway, inside the city to link Xiaguan and mainly town much more closely. In this condition, the district between the northern city and old town began to develop.

In addition, although the Qing government wanted to control foreign inside the Xiaguan area, foreign people were not satisfied to live there only. They tried to use the excuse that the land was too low-lying to rent to move out of there. After getting the agreement of Qing government, not only national consulates went into the town, but also foreign businessmen and some missionaries. Furthermore, they obtained a lot of land in the way of eternal lease. According to the numerical statement, during the period between the late Qing Dynasty and the early Republic of China, there were 144 pieces of fields eternal rent to American Christian church and company, 34 pieces of fields eternal rent to English Christian Church and company, and other 43 pieces eternal rent to French, Italian, Canadian and Netherlandish Christian church and company.

After owning property, British, America, German, Japan and other aggressive countries began to establish consulate, Christian church and school along the road from northern city and drum-tower road, including Hui Wen Academy, Malin Hospital, Greg Academy and so on. In addition, due to the education reform in late Qing Dynasty, the local government set up some schools in the district of drum-tower (between the

northern city and the old town) as well, for example, Sanjiang normal school, Jiangnan business school, Naval Academy, Zhuannan school and so on. In 1910, Nanyang market in a grand scale, named Quan-ye-chang, was set up in this area. According to the record from Jing-ling-guan, the Qing government use the land in a radius of seven miles to plan and build, including a power station, architectures belong to each province, a hospital, more than thirty stores and nearly thirty entertainment places. Furthermore, the Ningsheng railway especially set up a station beside the market, roads beside this market were repaired and broadened. Some stores, theaters and outdoor cinemas were built by private entrepreneurs nearly the mainly entrance of the market. Of course, there were many other interesting place as well. It was a pity that this prosperous scene didn't last for a long time and fell into decay quickly.

All in all, during this time, the developing of northern city was on the upgrade but also scattered and little. The place near drum-tower area also presented a natural scene. Even so, it revealed the initial development between the northern city and old town in that time.

Conclusion
Spatial Layout

Xiaguan area had developed rapidly to a district with the function of commerce, storage and transport, in which stores, banks, train station, warehouses and port were gathered. Furthermore, some large section of shantytowns formed in this area. During this time, Xiaguan extended along the Yangtze River, and became an enclave outside the old town. During this period, there were two commercial cores in Nanking city. One was located in Xiaguan area and the other one was the original core, which was located nearly Confucian Temple and Big palace. But due to the abolition of imperial examination system, examination hall lost its status and candidates no longer gathered in Confucius Temple, in this case, Confucius temple began to decline. Thus, the construction in northern city was too dense, so Nanking city began to develop to the east and north.

The old town still was the living area. There are still more than 2/3 space, farmland, ponds etc. No construction land within the city walls. Some new industrial enterprises were set up in the south of old town, including Nanyang printing office, Shengchang machine factory, electric wire office, etc. In this way, Nanking city extend her land to north as well.

The district between Xiaguan area and old town was full of public building, including Christian church, hospital and new type school. And Nanking city began to develop to north of the old city.

Designated function of city

During this time, the political status of Nanking was suffering from the huge changes. She changed from the capital of Jiangnan province and the resident of Jiangnan and Jiangxi porvince in the late Qing Dynasty to the national capital of Taiping rebellion. In the end, she was again recovered after the establishment of the Qing Dynasty. Suffering several wars, the economical status was declining, especially after the rise of Shanghai. Thus, the natural economy gradually disintegrated with the invasion of western countries. The traditional handicraft industry declined quickly, the development of modern national industry was quite slowly as well. Fortunately, due to the improvement of traffic status, the rise of modern industry and trade opening in Xiaguan area, the function of Nanking city achieved the transition from traditional agricultural society to modern industrial city, from the closed geographical center to open business center.

Construction method

Due to the economical recession and political unrest, spatial development wasn't under the control of the local government. We can say that, the urban space of Nanking was self-organization in that time. Although the Qing government took some action to repair road, set up port and large public building, from the whole, the evolution of

urban morphology didn't get a systemic planning. The development of the old town was gradual, and the urban construction was scattered, for example, the church buildings between Xiaguan and old town, industrial factory buildings in south of the old town, commercial buildings in Xiaguan and so on. Some roads were repaired and broadened during this time, but it caused by the emergence of new vehicle and the western culture.

References

Christopher G. (2010) ' Mega-events and socio-spatial dynamics in Rio de Janeiro, 1919-2016', *Journal of Latin American Geography* 09, 7-29.
Duan J. and Qiu G. C. (2009) *Conspectus of foreign urban morphology* (Southeast University Press, Nanking).
Duan J. (2006) *Urban spatial development theory* (Jiangsu science and Technology Press, Nanking).
Li P. L. (2012) 'An analysis of Nanking the development of public transportation from 1907 to 1937', published PhD thesis, Nanking Normal University, China.
Lv C. and Shi, Y. H. (2014) 'Study on urban planning and practice of Nanking based on the analysis of major event of urban planning and construction in Nanking during 1927 to 2012', *Modern city research* 01, 34-41.
Lynch K. (1960) *The Image of the City* (MIT Press, Massachusetts).
Meng J. M. (1991) *Research of urban intermediate structure* (University of Hehai Press, Nanking).
Malfas, M. and Theodoraki, E. (ed.). (2004) 'Impacts of the Olympic Games as mega-events', Municipal Engineer 09, 209-220.
Ma B. L. (1994) *Nanking Establishment Annals* (Haitian Press, Shenzhen).
Qu T. and Zhang, L. Q. (ed.) (2014) 'City spatial structure evolution affected by special events in different historical periods: A case study of Tianjin', *Geography Science* 06, 656-667.
Su Z. M. (2008) *Urban planning history of Nanking: Ancient Times & Modern Times* (China Building Industry Press, Peking).
Wen Y. (2007) 'The research on the development of Nanking city in Qing Dynsty (1644-1911)', published Master thesis, Sichuan University, China.
Wang Y. (2010) 'Study on the evolvement of urban space structure of Nanking', published PhD thesis, Wuhan University, China.
Xue B. (2008) *Nanking History* (Nanking Press, Nanking).
Xue H. (2014) *History of Nanking city from 1912 to 2012: Municipal construction* (Nanking Press, Nanking).
Xiong H. (2003) 'A study on the history of Nanking city planning during Early-modern period (1868-1949)', published Master thesis, Wuhan University of Technology, China.
Xia H. Y. (2001) *Nanking population annals* (Xuelin Press, Shanghai).
Xi Y. H. (ed.). (2008) *Nanking Urban Planning Annals* (Jiangsu people's press, Nanking).
Ye N. K. (ed.) (2014) *History of Nanking city from 1912 to 2012: Comprehensive introduction* (Nanking Press, Nanking).
Zhou Y. F. (1990) *Modern history of Nanking highway development* (Jiangsu science and Technology Press, Nanking)
Zhang B. (2003) 'An analysis of Nanking citizen's life from 1928 to 1937', published Master thesis, Jinlin University, China.
Zhi X. (2013) 'An analysis of the formation of the urban space in Nanking from 1927 to 1937', published PhD thesis, Fudan University, China.
Zhang X. Q. (2010) 'Study on the key urban planning events and thoughts of Tianjin', published PhD thesis, Tianjin University, China.

Learning from Japan

Lina Malfona
Facoltà di Architettura, Sapienza Università di Roma, Italy
Keywords: Tokyo, Japan, Urban Design, Urban Morphology, Contemporary Architecture

Abstract

Following to the publication of Barrie Shelton's recent book "Learning from the Japanese city", I intend to analyze the city of Tokyo from the perspective of its urban morphology by comparing it with the Occidental City. While Hidenobu Jinnai, one of the leading expert on Tokyo's urban morphology, stresses the difference between the Occidental public space, expressed by the square (a closed space, delimited by its surrounding buildings) and the Japanese one, expressed by the bridge (a place surrounded by an open area), Yoshinobu Ashihara defends the superiority of the invisible order hidden behind the chaos of Japanese cities, a sensation of impermanence expressed by the adoption of floating floors, so different from the European tradition of preferring walls. With regard to that, Fumihiko Maki identifies two different kinds of urban order: the Occidental City is a clock-city, a Newtonian city where the relation between the whole and the parts is systemic, whereas the Oriental City is a cloud-city, where the significant autonomy of its parts better relates to a fast changing society. One additional difference I intend to analyze can be found in the different systems of writing between East and West. While occidental letters have no autonomous meaning and need to be composed with other letters, as buildings connected to each other by the linearity of streets in occidental cities, each Japanese kanji grapheme has a meaning of its own, as stylized representations of ideas, like the Japanese neighborhood in which the chō is an urban generating cell.

Introduction

Sometimes the beauty of a landscape can be measured simply by the presence of rock. Rock is often not immediately evident, covered by a blanket of terrain or hidden under a weighty turf. At times, rock emerges along linear segments, skirting old walls or deep crevasses. More frequently, rock has a splintered, pierced, fragmented aspect. I come from a country in which rock seems to emerge from the ground in a sublime manner and where a mountain can be revered for its magnificence and its imposing solitude, and that is also at times transfigured into a monument to a divine essence that pervades nature evenly, but that somehow does not embrace humans, keeping them at a distance.

In Japan, Mount Fuji is revered as a divinity, so that an entire city can appear as a uniform platform without any quality on which Fuji's tall cone towers, as a platonic figure, almost mystical, stretching towards the sky.

However, when living in a dense Japanese city, as if in a carpet of tightly knitted houses, Mount Fuji disappears and can only be seen by flying over the city roofs with our imagination (or maybe by just taking an elevator). The *shintoist* sentiment seems to encompass every element of the landscape, except cities. Rocks, rivers, forests, they all are encompassed together with humans and the things dearest to them, such as the architectures that represent their most elevated spirit, their perennial attempt to reach for the absolute. In Finland, the complexity of the territory can be appreciated just by looking at its wide expanses, dominated by an uninterrupted sequence of rocks-forests-lakes in which cities are just small components, yet precious for their urban configuration. On the contrary, the complexity of Japan's territory can only be appreciated from a precise height, either by lifting ourselves over cities or by lowering ourselves in the domestic spaces. The importance of eye height in the Japanese architecture is demonstrated in the contemporary works of Kengo Kuma e Waro Kishi (fig.1), among others, but also in the ancient Zen Buddhist temples and teahouses, where the height from which the surroundings are observed reveals a particular manner of experiencing the architectural space. In fact, in the Japanese living rooms, people seat on the *tatami* mat, which is a textile floor covering. For this reason, the inhabitants' view level is lower than the standard one.

These premises explain the peculiar section that characterizes Japanese buildings, the height of curtains and the position of windows in the façade of houses. The prints of Hiroshige Utagawa[1], for instance, reveal this peculiar way of *seeing*. They frame only a portion of space, i.e. what can be seen while being seated in a cross-legged position on the *tatami*. Nevertheless, they also reveal the Japanese attention to detail, together with their renouncing a more general vision, sacrificed for a more congenial incompleteness. Similarly, the Japanese city appears particularly well finished from a closer look (i.e. at a small scale), but at a large scale (i.e. from above) the urban fabric does not comply with any type of formal order[2].

Introduction. Confronting chaos

Japan has become an experimental laboratory many years ago, one permeable enough to external influences to capture the power to attract that was once of Europe. However, in the eyes of Westerners, the Japanese city still looks like an illogical *patchwork*, made of juxtaposed fragments, where one has a hard time trying to orient oneself or trying to remember the followed paths. While crossing the streets of Tokyo, according to Franco Purini, one can feel as "pure comparse di una rappresentazione urbana nella quale, in un estatico annullamento, l'individuo è completamente trasceso assieme all'immensa massa metropolitana in cui esso si dissolve"[3].

Yet in this city, according to Charlotte Perriand, as quoted by Manfredo Tafuri, "gli

[1]Utagawa, H. Cento vedute famose di Edo, 119 prints (1856-58).

[2]Consider the famous Marc-Antoine Laugier's motto: "ordre dans le détails, tumulte dans l'ensemble" (Essai sur l'Architecture, 1755).

[3]Purini, F., "Introduzione", Sacchi, L., Tokyo-to, Skira, Milan, p. 8.

Figure 1. Waro Kishi, House in Yamanoi, 2014 (photo by L. Malfona)

aspetti vitali sono insiti proprio nella discontinuità, nelle fratture, nei compromessi, che i giapponesi accettano come base di una nuova ricerca di continuità"[4]. This sentence might be partially true, but in Japan the notion of urban *continuum*, as intended by Westerners, is entirely absent, as it does not part of the tradition of this country, it is not required. This is one of the main differences with the Western city. But what is the reason for this absence?

According to Manfredo Tafuri, the Japanese city is composed of "pezzi isolati al di fuori di anche parziali complessi unitari o sistemazioni cittadine", so that "alla fertilità e alla prepotente espressività dell'architettura corrisponde l'assenza quasi totale della pianificazione"[5]. But there are some exceptions, for instance the great complexes designed by Fumihiko Maki[6], such as the *Hillside Terrace* in Tokyo (1969-1992), which inspired the most recent ones, such as the Nexus World in Fukuoka (1991) by Arata Isozaki, Steven Holl e Rem Koolhaas, among others, and the *Shinonome Canal Court* in Tokyo (2003), designed by Toyo Ito, Kengo Kuma and others. Actually, the Japanese city, in spite of its *calligraphic* and *anti-urban* nature, confronted chaos by developing a regulatory device that is by far superior to the European one. I am referring to its subway network, so pervasive it might virtually substitute Tokyo's network of ground level streets. In the Japanese city, the subway has become the main means of transport, as well as an instrument for gauging its urban space.

Methodology. A comparison and a synthesis

Barrie Shelton, one of the foremost experts in the field of urban morphology, in his book "Learning from the Japanese city"[7] compares the positions respectively held by Western and Japanese academics. Among the Westerners, Gunther Nitschke, for instance, maintains that the urban space in Japan is not constituted of formal or geometrical elements, but rather that it is the outcome of all the activities performed there[8]. At a later stage, Be-

[4]Tafuri, M., L'architettura moderna in Giappone, Cappelli, Bologna 1964, p. 48.

[5]Tafuri, M., op. cit., p. 126.

[6]Consider the project for the district of Dojima (Osaka, 1961).

[7]Cf. Shelton, B., Learning from the Japanese City. Looking East in Urban Design, Routledge, London, second edition, 2012, cap. 1.

[8]Nitschke, G., "'Ma': the Japanese sense of 'place' in old and new architecture and planning", Architectural Design, March 1966, pp. 117-130.

tond Bognar took Nitschke's thought into consideration, by refining it and by explaining the Japanese city as an additive product that is not determined by visual hierarchies[9]. The English writer Peter Popham supported these observations, by describing the city's outline as marked by continuous uplands and hollows, "hard shell and soft yolk"[10]. This sentence refers to the coexistence of a crown of tall buildings on the quarters' border and a core of low buildings in its center, so if the Western city is centrifugal in character, the Japanese one moves centripetally, from outside in.

On the Eastern front Hidenobu Jinnai, in his noteworthy urban studies, one the one hand stressed the differences between the Western public space, based on the *piazza* (an enclosed space, delimited by buildings), and the Japanese one, based on the *bridge* (which has, on the contrary, *open borders*)[11], on the other he highlighted the persistence of the urban layout as a common element in the European and Japanese cultures. Consider, for instance, the urban layout of the ancient city of Edo: it lives again in the network of the streets of Tokyo, as it happens in the European cities. Yoshinobu Ashihara – who elucidated the nature of the urban order, hidden behind the chaos of the Japanese city[12] – explained that the Japanese architectural tradition is based on the *floating floor*, which is raised above the ground. This consideration underlines the general sense of instability, which is innate in the tradition of Japanese construction, so different from the Western tradition of the *wall*, symbolic of the eternal nature of architecture. With regard to that, Fumihiko Maki referred to two types of urban order: the Western city is seen as a *clock-city*, in which the relations among all its parts are *systematic*; on the contrary, the Eastern city is described as a *cloud-city*, in which the independence among its parts conforms better to the fast changes of society[13].

One of the most profound differences between the European and the Japanese cities concerns the direction of writing used by the two cultures. In the West, the letters of alphabet are disposed on horizontal lines, which in turn are arranged from top to bottom, whereas in Japan the letters are organized in both horizontal and vertical directions and are placed in the center of each of the small squares that compose the virtual grid they use to arrange letters on a page. Moreover, while a single letter of the Western alphabet has no individual meaning as it has to be arranged with other letters, each *kanji* (the Japanese characters, acquired from the Chinese culture) has its own meaning, as it is a stylized representation of a set of objects or ideas. Lastly, while the European alphabet is a finite and complete set, the set of *kanji* characters is intrinsically incomplete and unlimited; indeed, each kanji can acquire new meanings, by combining new and old ideograms.

By understanding that the way in which a culture conceives and arranges space is related to the graphical qualities and the visual expression of its language, it becomes easier to understand why, in the Western tradition, the organization of the urban space is related to the *linearity* of the street, along which buildings are arranged (as the letters of the alphabet), while in Japan the autonomous *block* constitutes the primary cell of the urban space (as the characters of the Japanese writing).

Moreover, the Japanese preference for the area – as opposed to the Western inclination for the line – affected many other notions of space: consider, for instance, the *QR code*, which is used to attribute a selling price to a good. This code, so popular in Japan, is significantly different the Western *barcode*: while the latter conveys a linear and sequential organization, typical of European cities, the former represents an area and indeed, in the field of urban design, the structure of *QR codes* is similar to that of the *chō*[14], the Japanese block, which contains within its borders many structures built in many different ages.

[9]Cf. Bognar, B., Contemporary Japanese Architecture, Van Nostrand Reinhold, New York 1985.

[10]Popham, P., Tokyo: the City at the End of the World, Kodansha International, Tokyo 1985, p. 48.

[11]Cf. Jinnai, H., "Tokyo then and now: keys to Japanese urban design", Japan Echo, 14, 1987, pp. 20-29.

[12]Cf. Ashihara, Y., L'ordine nascosto, Gangemi, Rome 1995.

[13]Cf. Maki, F., "City, image and materiality", in Salat, S. (ed.), Fumihiko Maki: An Aesthetic of Fragmentation, Rizzoli, New York 1988.

[14]Chō identifies the micro-city, which composes the district of the Japanese city.

Figure 2. Fumihiko Maki, Spiral Building, 1985
Figure 3. Yoshijima House, 1917

Therefore, in Japan urban design has a peculiar declination: it is intended as a syncretic – not synthetic – mosaic of heterogeneous parts and, according to Shelton, "the stronger inclination in Japan has been to put things together by juxtaposing and connecting parts, not necessarily 'integrating' them – but accepting 'coexisting' as form of 'synthesis'"[15].

This approach emerges clearly in the project for the Spiral Building (1985), designed by Fumihiko Maki. This edifice might be seen as a strategic pole, i.e. as a *node* in which the seesawing dynamics between the built form and the urban space are concentrated. In fact, Tokyo can be seen as a *rhizome* – according to the Kisho Kurokawa's biological metaphor[16] – whose multi-nodal geography emerges exactly in urban nodes such as the Spiral Building. Here the autonomy of the architectural components, which compose the volume, is a metaphor of urban syncretism, so that the building façade – composed through the technique of *assemblage* – can be compared with the urban shape of Tokyo, a kind of *collage-city*. (fig.2)

A brief interview with Fumihiko Maki (September 2014, unpublished)

LM. The city of Tokyo seems to be designed "from inside", starting from a basic cell, i.e. the block. On the contrary, the city of Rome seems to be designed "from outside", following the directions of an urban design. For this reason, Rome has a stronger imagine and a more precise *figure*. On the contrary, Tokyo is more ambiguous and its image seems blurred, unstable, elusive. Do you agree?

FM. I recommend you a book, "Learning from the Japanese City". This book is a morphological survey on Tokyo that you will certainly find interesting. Tokyo is quite different from Westerner cities. In this book, among other things, Barry Shelton compares the characteristics of Tokyo with the icons of the Western city.

LM. In what direction is the city of Tokyo going, in your opinion?

[15]Shelton, B., op. cit., Preface to Second Edition, p. VIII.
[16]Cf. Kurokawa, K., The Philosophy of Symbiosis, Academy Edition, London 1994.

FM. It is going to shrink, because we are losing our population, that is, our population is reducing. Right now, Tokyo is increasingly being populated by people coming from peripheral areas, but soon we will have to face the problem of population decrease. They all will grow old and hence nothing will be able to stop this contraction eventually, even in Tokyo.

Forming process. Diachronic principles

After the age of Enlightenment, Westerners no longer perceived the Japanese heritage as a refined world, made of artistic gardens and *Ukiyo-e* (images of the "floating world"), but rather as an almost shallow, unstable and precarious culture, void of remarkable figures. However, in the Japanese city nothing is accidental, as every change happens as a consequence of an historically well-founded process. Consider, for instance, the transformations of the *sakariba* (i.e. the entertainment and bar districts), where the ancient glowing signs – as the small and large banners, the inclined bamboo poles and the hanging lanterns, the flags and the sliding timber frames, that so fascinated Frank L. Wright – have been replaced, according to a diachronic principle, by the power of neon and modern electronics, by metal panels and shutters. The temporary nature of Japanese buildings is rooted in the historical need to fabricate something akin to a *portable* house, one that can be relatively easily dismantled and replaced, because of frequent blazes, ground instability and other geological hazards. On the contrary, in Europe, the same causes would lead to strengthening constructions.

The Japanese city did not exercise an attraction on the architects of Modern Movement as intense as the one the architecture of ancient edifices had. One the one hand, Japanese buildings were endowed with an intimistic, essential and tectonic nature, a sort of mysticism, on the other hand, the domestic space is characterized by flexibility, modularity and elegance. Japanese architecture was first discovered and then raised as a model thanks to the travels of Frank Lloyd Wright (1943) and Bruno Taut (1936-7). In particular, Taut was fascinated by the "spiritualità filosofica"[17] of the Katsura Imperial Villa, in Kyoto, whereas Wright was affected by the standardization of architecture, as well as by the process of "eliminazione dell'insignificante"[18], evident from both the Japanese prints (*Ukiyo-e*) and the traditional dwellings (*machiya*).

Therefore, a sublime sense of restraint, together with the inclination toward a lyric and eternal form can be found in those Japanese houses, which come from both Meiji (1867-1912) and Taisho periods, as Yoshijima House in Takayama (1907) (fig.3)

The house belonged to a *sake* manufacturer and is divided into five groups of rooms, disposed around two gardens, defined by *engawa*, i.e. porches, which acted as a sort of filter – open in the summer and closed in the winter – to those gardens. The residential building is organized – as in the Japanese tradition – according to a sequence of open spaces, not connected by corridors, raised from the ground and walkable on bare feet. All the spaces are modular and flexible enough to change their end use at least three times a day, according to different demands: one can place a portable table for dinner, some cushions *zabuton* or a *futon*, in order to receive guests or to rest. The domestic space of the house is characterized by the presence of sliding partitions and removable curtains (light or heavy according to the seasons); large wardrobes, used to store mobile furniture; *tatami*, a sort of soft floor covering, whose dimension (1m x 2m) defines also define the dimension of entire building. The main room is destined to business and is placed beyond the entrance; it is a double-high space, covered by a large aerial framework, which sustains the roof. Without doubt, the modernity of the spatial conception of its framework is astonishing and reminds of some bold structures, as the main room of Taliesin III, designed by Frank L. Wright after his travel to Japan, the Terragni and Cattaneo' frameworks, the Five Architects' buildings, the Ungers and Dudler's obsessive spaces; the Purini and Thermes' metaphysical trusses. The roof framework seems to be a symbolic

[17]Taut, B., Houses and People of Japan, The Sanseido Co. Ltd, Tokyo 1937, p. 291
[18]Wright, F. L., An autobiography, Duell, Sloan and Pearce, New York 1943, p. 194.

Figure 4. Takenaka e Cesar Pelli, Abeno Harukas, 2014 (photo by L. Malfona)

structure, representative of the family status, but it also has the role of connecting sliding partitions (made of rice paper) with timber beams.

Probably, the authentic *Shibui* character – that permeates Japanese architecture – can really be found in this building. According to Manfredo Tafuri, that adjective cannot be translated, but it "esprime sinteticamente l'anima stessa della tradizione culturale orientale: esso indica un modo di essere e di esprimersi figurativamente, allo stesso tempo oggettivo ma non distaccato, nobile ma privo di tragicità, calmo ma non inerte, bello ma non lezioso, nuovo ma sostanzialmente legato alla tradizione, con qualcosa di inusitato e originale pur conservando una patina creata da una lunga elaborazione nel tempo: in un tempo a sua volta storicamente indeterminato, caratterizzato piuttosto come presente continuo"[19].

Conclusion. After Shibui

Clearly, today the *Shibui* spirit has been replaced by other features. Indeed, already in the sixties, Metabolism[20] introduced the megastructure ideology, leading to a profound modification of aesthetic theories. Instead, a sort of ideological emptiness appeared starting from the seventies, after the Osaka Exposition, despite the theoretical work of architects and critics, as Arata Isozaki and Kazuo Shinohara, whose aim was to establish a substantial relationship between building and urban fabric[21]. As it is well known, they did not have any followers and Toyo Ito eventually denied the relationship between architectural typology and urban morphology, by creating introvert microcosms. Thus, a

[19]Tafuri, M., op. cit., p. 110
[20]Cf. Koolhaas, R., Obrist, H. U. (eds.) Project Japan, Metabolism Talks..., Taschen, Koln, 2011
[21]Frampton, K., Storia dell'Architettura Moderna, Zanichelli, Bologna 2008.

sort of simplicity has prevailed, in the way Ito combined nostalgia for the architectural tradition, which is permanently lost, and superficiality of the present day icons[22].

Another trend of the contemporary age is the notion of a building intended as a *microcosm*, i.e. as an autonomous machine, which incorporates all the components of a whole city[23]. Consider, for instance, the skyscraper designed by Takenaka Office and Cesar Pelli in Osaka (2014). It covers an area of 3000 square meters per floor and is the tallest building in Japan (300 meters). *Abeno Harukas* (fig.4) has become a landmark for the city, it is a mixed-use building composed of reciprocally connected towers; for this reason, Fumihiko Maki compared this colossus to a battleship[24]. Moreover, its volumetric arrangement is similar to the monolithic figure of *The Rotterdam*, the skyscraper designed by Rem Koolhaas, a glazed building, similar to an enormous rock. The image of the mountain, mentioned in the first paragraph, has transfigured in the form of these last buildings – a sort of huge crystalline structure – in order to signify that Japan is suspended between the ephemeral existence of buildings that last, on average, 26 years and the will to reach more durable summits.

One can admire the beauty of Tokyo by passing through the causeway *Roppongi Dori*, up to where it touches the ground and innervates the living body of the city. The beauty of this city is nurtured by strong contrasts. Evidently, the figure of an aerial walkway, which splits the skyscrapers' profile, elicits a sense of danger, but when the street disappears, only that split remains, as a fissure between tall buildings. It allows us to see one of the possible horizons of the city.

References

Ashihara, Y. (1995) *L'ordine nascosto* (Gangemi, Rome).
Ito T. (1978) "Collage and superficiality in Architecture", in Frampton, K. (ed), *A New Wave of Japanese Architecture* (IAUS, New York), 68-9.
Jinnai, H. (1987) "Tokyo then and now: keys to Japanese urban design", *Japan Echo* 14, 20-9.
Koolhaas, R., Obrist, H. U. (eds) (2011) *Project Japan, Metabolism Talks...* (Taschen, Colonia).
Kurokawa, K. (1994) *The Philosophy of Symbiosis* (Academy Edition, London).
Montagnana, F., Hayashi, T., Y. Hayashi (eds) (2009) Le case del tè (Electa, Milano)
Mulligan, M. (ed.) (2012) *Fumihiko Maki. Nurturing Dreams. Collected Essays on Architecture and the City* (The MIT Press, Cambridge MA)
Nitschke, G. (1966) "'Ma': the japanese sense of 'place' in old and new architecture and planning", *Architectural Design*, March, 117-30.
Tafuri, M. (1964) *L'architettura moderna in Giappone* (Cappelli, Bologna).
Salat, S. (ed.) (1988) *Fumihiko Maki: An Aesthetic of Fragmentation* (Rizzoli, New York).
Shelton, B. (2012) *Learning from the Japanese City. Looking East in Urban Design* (Routledge, London).

[22]Ito, T., "Collage and superficiality in Architecture", in Frampton, K. (curated by), A New Wave of Japanese Architecture, Catalogue

[23]Frampton, K., Megaform as urban landscape, University of Illinois, USA 2010.

[24]Maki, F., "On visiting Abeno Harukas", Shinkenchiku, special issue: Big Compact. Abeno Harukas. Supertall Compact City, September 2014.

The Morphological Effect of Public Transportation Systems on Cities: Urban Analysis of Transit-Oriented Development (TOD) in Swedish Cities

Todor Stojanovski
Urban Planning and Environment, KTH Royal Institute of Technology, Sweden
Keywords: Transit-Oriented Development (TOD), compact city, public transportation, urban form, morphological effect

Abstract

Architecture and urban design generate need of travel by creating and stockpiling network capital; and produce frontages, exit and entrance in urban space which hinder and facilitate urban flows. The morphological effect of public transportation on cities is analyzed by looking at attractive street frontages or building façades in urban spaces around transit stops and stations.

The European cities historically unfolded around public transportation stops and stations during the industrialization in the 19th century. Urban cores and corridors created then stayed until today as relics of that age. These artifacts are explored in Swedish cities to understand how public transportation shapes cities. These consistencies in urban design and form can be crucial for implementing policies of Transit-Oriented Development (TOD) in Europe and around the world.

Introduction

Transit, a shortening from mass transit, is an American catchall for public transportation (Cervero, 1998) and Transit-Oriented Development (TOD) is a policy to design and develop dense, attractive and walkable urban environments that enhance the use of public transportation. In a broader perspective, it deals with synchronizing the urban life, its everyday activities and mobility patterns, the development and growth of the city with public transportation (Stojanovski et al., 2014).

The public transportation and its integration with cities has been a leitmotif of urban design in the European compact city and American TOD since the 1990s (EC, 1990; Calthorpe, 1993). The sustainable mobility challenge in European cities is to break the dependence on oil without compromising the mobility (EC, 2011, p.5). The ambition is to create integrated, multimodal transportation systems that fully exploit the potential of public transportation (EC, 1997, pp.11-2) where greater numbers of passengers are carried jointly to their destination by the most efficient (combination of) modes (EC, 2011, p.5).

The sprawling of cities often acts as an obstacle to sustainable mobility which causes high automobile dependence and TOD is conceived as a solution. TOD revolves about walkability and assisting access to public transportation (TRB, 2004). The walking distances determine the size of the TOD and there are accustomed rules of the thumb about proximity to public transportation: 300-400 m or quarter mile walk to the bus (5 min) and 700-800 m or half mile to the train (10 min). These distances were used by architects and urban designers as urban boundaries for neighborhoods from the mid-20th century and they are still used in the TOD guidelines (Calthorpe, 1993). The heuristics of proximity to public transportation are never questioned, neither the assumption that the effect of public transportation spreads equally within the urban boundaries of TOD. How the effect of public transportation influences urban form and spreads in the urban environments?

Urban morphology of public transportation and Transit-Oriented Development (TOD)

Traditionally, urban form is defined through form and process, historical layering of urban patterns: 1) street layouts, 2) lots and their aggregation in blocks, and 3) buildings in blocks (Conzen, 1960); and land utilization (Birkhamshaw and Whitehand, 2012), on small scale; and creation of fringe belts from different urbanization periods on medium scale (Conzen, 1960; Whitehand, 1967). In another urban discourse the cities are conceived "extraordinary agglomerations of flows" of people on the move, information, capital (Ash and Thrift, 2002, pp.42). Each place in the city is a node in a glocal urban network, with a network capital (Urry, 2007) which contributes in the struggle for global distinction. The network capital equally revolves around connectivity as well as around the quality of place: Why to go there? What to do there? What is there? Who is there? What is going on there? (Florida, 2008) The urban lives are mobile and experienced as sequences of more or less attractive fixed places and vehicles on the move (buildings, streets, squares, cars, buses, trains, airplanes, etc.). In a broader context of form and flow (Lynch and Rodwin, 1958), a mix of traditional and 'networked cities' urban morphology, architecture and urban design interface with transportation systems, produce street frontages, getaways and affordances (Gibson, 1986) and create network capital that hinder or stimulate movement and mobility. The effect of public transportation systems on cities is multileveled. It is visible in the proximity of stops and stations on a small scale and in establishment of urban networks on medium and large scale, regionally and globally. There is not much focus on interfaces between urban form and flow. The urban form and transportation systems can be conceived though two perspectives: top vs. within. The two perspectives are consequence of two modes of thinking: hot vs. cold, fast vs. slow, emotional vs. cognitive, reflexive vs. reflective (Metcalfe & Mischel, 1999; Kahneman, 2011). The top perspective is reflective and generalizing, whereas the within perspective is reflexive and responsive to environmental stimuli. There are three focuses that also has to merge: the urban form, transportation systems and the interfaces in between (Table 1).

Table 1: The interplay between urban form and transportation systems (urban flows) from two perspectives

	Urban form	Interfaces	Transportation systems
Top perspective (reflective)	Urban patterns (mosaics of places or elements, networks of places or elements)	Interfaces between places (exits and entrances between cityscapes, entering or exiting urban flows, etc.)	Mobility patterns (transportation networks, mobility between places, individual travel behavior, wayfinding and mental maps)
Within perspective (reflexive)	Cityscapes (observing and responding to environmental stimuli)		Being in an urban flow

Peter Calthorpe (1993) argues that TOD has two scales (urban space and regional city scale), but there are also finer psychological levels within these scales tangling interfaces between places and entering or exiting urban flows. The interfaces between urban form and public transportation systems are both physical (stations or stops) and psychological (change between the modes of thinking by entering or exiting urban flows). The complexity of perceiving an urban environment or being in a flow combined with the cognition of urban environments and generalization about urban form and mobility can be described and structured with the PATTERN LANGUAGE which tangles both URBAN and MOBILITY PATTERNS.

PATTERN LANGUAGE of URBAN and MOBILITY PATTERNS

Within urban morphology, the PATTERN LANGUAGE (Alexander et al., 1977; Alexander, 1979) is one way of looking the cities, their physical form and the urban life within cities. Christopher Alexander argues that each building, neighborhood and town has a particular morphological character marked by patterns underlying it: patterns of events and physical spaces. Each URBAN PATTERN consists of underlying elements and relationships between elements that can be formulated as:

X = r (A, B, C, etc.)
X type
r relationships between elements A, B, C, etc.

Urban design accrding to Alexander is a morphogenetic process where the number of generic URBAN PATTERNS is not terribly high, but there are many variations and replication of few genotypes. Each city has its own distinctive set of URBAN PATTERNS, either unique or recurring across the city, which exist on different scales. Each pattern is connected to certain larger patterns (for example MAIN STREET is part of URBAN CORE where URBAN CORE = r (MAIN STREET, etc.) which come above; and to certain smaller patterns which come below (MAIN STREET = r (COMMERCIAL FRONTAGES, STROLLING, CORNER CAFÉ, BUS STOP, CROWD OF PEDESTRIANS, etc.). Some URBAN PATTERNS are interdependent. There is no URBAN CORE without a MAIN STREET or COMMERCIAL FRONTAGES.

There is a hierarchy between elements in traditional urban morphology described with relationships. The streets are most rigid element that influences patterns of lots and lot division of the blocks. The urban blocks are created by combination of lots and streets. The urban block is seen from a street (Italian school) perspective, one street with aligning lots, or from a lot (German and British school) perspective, a block is all the lots surrounded by streets. The urban blocks via lot sizes and street patterns influence the buildings. BIG BOX BUILDINGS need LARGE LOTS and MOTORWAYS. In the end the land utilization often depends on the type of buildings. These relationships are formulated the traditional elements of URBAN FORM:

URBAN FORM = r (LAND UTILIZATION (INCLUDING BUILDING UTILIZATION) = r (BUILDINGS = r (URBAN BLOCK = r (LOTS = r (STREETS))))).
The PATTERN LANGUAGE is applicable for public transportation. There are underlying

and overlaying URBAN and MOBILITY PATTERNS in public transportation. Different PUBLIC TRANSPORTATION NETWORKS AND SERVICES exist on different scales. The TRUNK-FEEDER SYSTEM is common as regional pattern in a context of European public transportation planning. The TRUNK and FEEDER LINES are often completed with DIRECT LINE services, direct connections between important origins and destinations. There are also COMMUTER SYSTEMS only, for example in Brisbane. A set of PATTERNS including PUBLIC TRANSPORTATION NETWORKS AND SERVICES can be summarized by the planning genotypes:

TRUNK-FEEDER SYSTEM = r (TRUNK LINES, FEEDER LINES, DIRECT LINES, etc.);
COMMUTER SYSTEM = r (DIRECT LINES).

Within the overlaying URBAN PATTERNS of PUBLIC TRANSPORTATION NETWORKS AND SERVICES each BUS LINE or TRAIN LINE has its own morphological character. There are MOBILITY PATTERNS that include WEEKDAY COMMUTING, HOLIDAY JOURNEY, HIGH SPEED, etc. If we consider the blue BUS LINE 1 in Stockholm it has distinctive elements:

BUS LINE 1 = r (BLUE BUSES, 15 MIN MINIMUM FREQUENCY, SERVICE AROUND THE CLOCK, LOW SPEED, URBAN PROSPECT, BUS ON STREET, etc.).

The PATTERN LANGUAGE of public transportation and TOD

TOD was introduced by Peter Calthorpe (1993) as design or development of moderate or high density mixed use urban environments at strategic points along a regional public transportation system. Calthorpe differentiates two URBAN PATTERNS: urban and neighborhood TOD that are described though preferred mix of functions (residential, commercial and public spaces), street layouts, mix of housing types, etc. The two scales can be formulated through LOCATION AND CONNECTIVITY and WALKABILITY AND INTEGRATION as:

TOD = r (LOCATION AND CONNECTIVITY = r (PUBLIC TRANSPORTATION NETWORKS AND SERVICES, NETWORK CAPITAL)); (WALKABILITY AND INTEGRATION = r (URBAN FORM, PUBLIC TRANSPORTATION INFRASTRUCTURE, INTERFACE BETWEEN URBAN FORM AND PUBLIC TRANSPORTATION INFRASTRUCTURE))

The development of PUBLIC TRANSPORTATION NETWORKS AND SERVICES results in a certain hierarchy and uneven NETWORK CAPITAL in the urban mosaic of one region. The NETWORK CAPITAL of each place depends on the centrality within the network. At the large scale the TOD urban patterns exist in a context of the location of the neighborhood in the public transportation network and its connectivity. Ditmar and Poticha (2004) has developed a typology of places and preferred PUBLIC TRANSPORTATION NETWORKS AND SERVICES in respect to the different urban fringe belts in American cities. More generally the fusion of PLACE and PUBLIC TRANSPORTATION NETWORK LOCATION AND CONNECTIVITY can be conceived though a typology on its own:

1. REGIONAL NEXUS (URBAN CORE WITH REGIONAL IMPORTANCE) (a transfer point between trunk lines)
2. REGIONAL CORE (PART OF AN URBAN CORRIDOR WITH REGIONAL IMPORTANCE) (on a trunk line)
3. LOCAL URBAN NEXUS (a transfer point between trunk lines)
4. LOCAL URBAN CORE (PART OF AN URBAN CORRIDOR) (on a trunk line)
5. TRANSPORTATION NODE (TRANSFER POINT) (a transfer point between trunk lines or terminal where feeder lines branch)
6. WELL-CONNECTED PLACE (on a trunk line)
7. POORLY-CONNECTED PLACE (on a feeder line)
8. OFF-GRID PLACE (no public transportation service)

Figure 1. Hypothetical desirability TOD CORES for the four principal PUBLIC TRANSPORTATION INFRASTRUCTURES: 1) public transportation on streets unfolds elongated corridors, 2) completely segregated public transportation creates amoebic cores on the exists of the stations; 3) underground public transportation produces amoebic cores depending on the pattern of subway exits; and 4) partially segregated railways or busways unfold two elongated cores due to barrier effect in urban space.

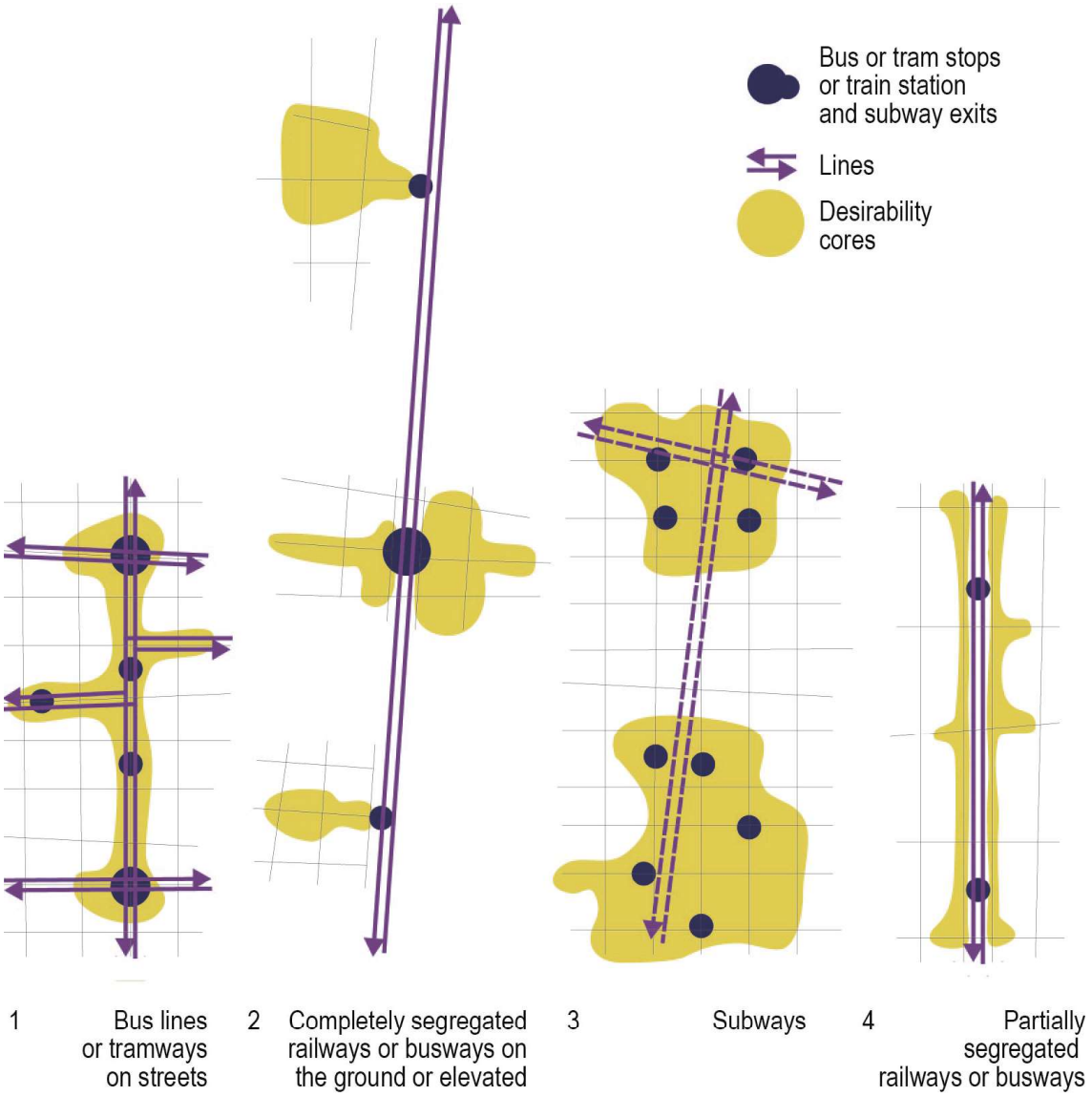
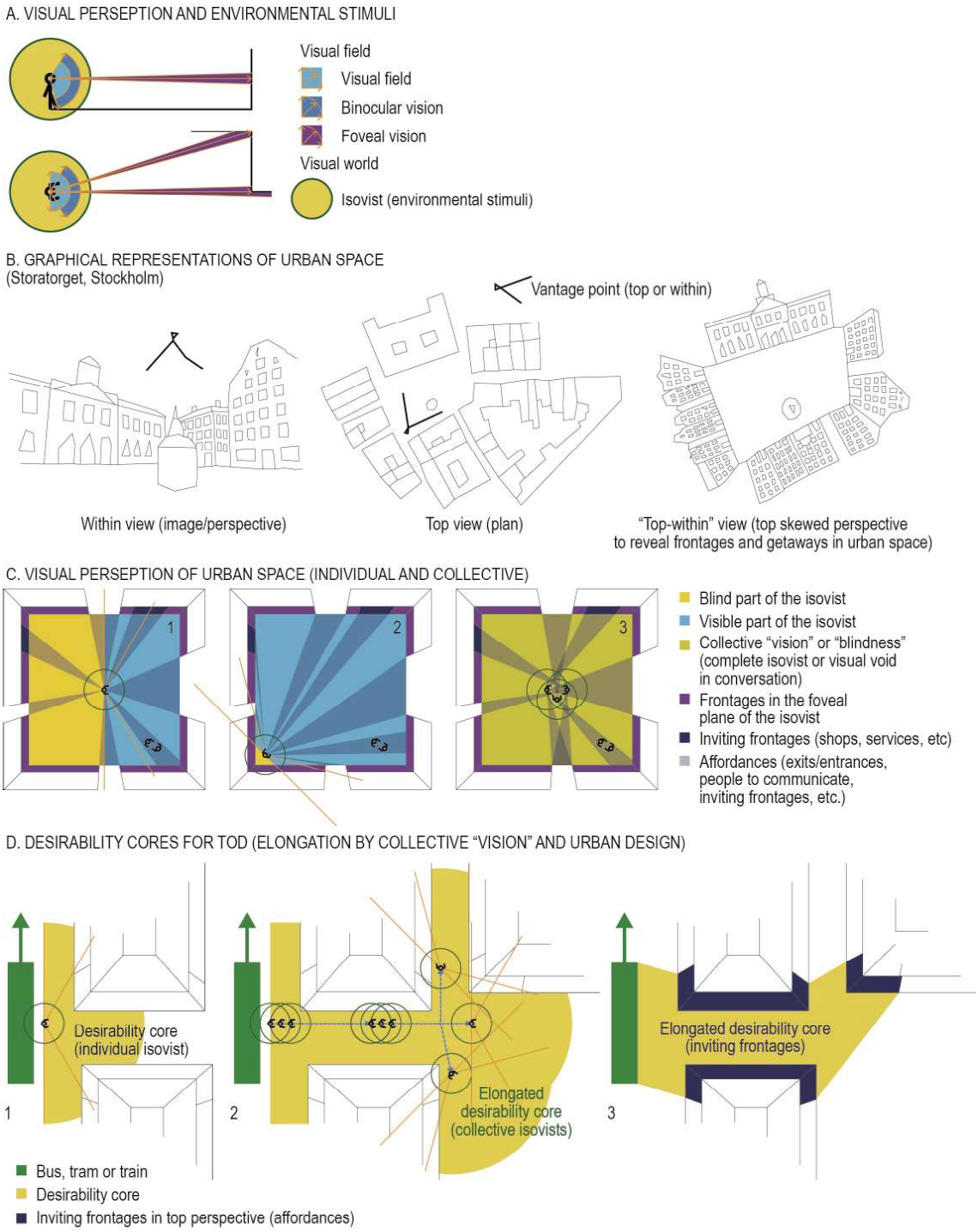


Figure 2. Methodology to analyze TOD CORES



The regional scale tangles motorized mobility and accessibility throughout the urban network of one region. The urban scale revolves around integration of public transportation infrastructure in the urban form that allows for easy walking access. At urban scale there is interplay between PUBLIC TRANSPORTATION INFRASTRUCTURES and the traditional URBAN FORM elements. There are four principal PUBLIC TRANSPORTATION INFRASTRUCTURES in a context of the street as traditional morphological element (Stojanovski, 2013a):

1. PUBLIC TRANSPORTATION ON STREETS (bus lines and tramways, bus stops and tram platforms);
2. COMPLETELY SEGREGATED PUBLIC TRANSPORTATION, either elevated or on the ground (buses or trains on heavy railways or busways, completely segregated train or bus stations on the ground or elevated);
3. PUBLIC TRANSPORTATION UNDERGROUND (railway or bus tunnels);
4. PARTIALLY SEPARATED PUBLIC TRANSPORTATION ON GROUND (light railways or busways, bus stops and tram platforms).

The level of segregation or integration by PUBLIC TRANSPORTATION INFRASTRUCTURES shapes zones for TOD as URBAN PATTERNS:

1. TOD CORE (100 m default or 1-2 min walk, but they can extend depending on the urban design, zone that generates maximum number of passengers)
2. ZONE IN WALKING DISTANCE (100 to 400-600 m or 2 to 5-7 minute walk) the number of passengers roughly halves
3. ZONE OF ACCESS (up to 2 km or 30 minute walk)
4. BUS FEEDER ZONE (5-15 minute ride)
5. CYCLING FEEDER ZONE (5-15 minute ride)
6. KISS and RIDE /PARK and RIDE ZONE (5-15 minute drive)

The argument here is that there are different zones within walking distance to a stop or station. There is a desirability core (Stojanovski 2013), the most desirable TOD zone in the center. The morphological effect on architecture and cityscapes is visible firstly in the TOD CORE zone. The TOD CORE zones are tentative and question the traditional urban design heuristics about walking distances.

The hypothesis and morphological method to analyze TOD CORES as interfaces between URBAN FORM and PUBLIC TRANSPORTATION

Even though the coinage TOD was introduced by Peter Calthorpe in the 1990s, the TOD is nothing new. Urban cores or corridors created during in different periods of urbanization, especially during the European industrialization and the age of railroads, stayed until today as relics of that era. Historically, many European cities developed as compact cities along public transportation systems, mainly railroads throughout the 19th and the beginning of the 20th century (Stojanovski et al., 2012). The hypothesis is that the URBAN PATTERNS of PUBLIC TRANSPORTATION INFRASTRUCTURES have a consistent morphological effect historically on the TOD CORES (Stojanovski, 2013) in respect of direct effect on architecture and cityscapes around stations. The hypothesis of the TOD CORES can be represented and analyzed graphically (Figure 1). Thus morphological methods are applicable to analyze the URBAN PATTERNS of public transportation and TOD in existing cities. The proposed method involves theory on orientation and perception in urban environments through the concept of affordances in environmental psychology. The broad concept of URBAN PATTERNS allows awareness of the scale of the analysis in the TOD PATTERN:

The first preposition is that a person in the urban environment orients itself differently as an individual and a group. The urban environment is directly perceived through the visual field. The visual field is the area within the fields of view of the both eyes. It is clear in the center (foveal vision field) and vague in the periphery. It extends 180° from side to side and 140° up to down and it is oval in shape (Figure 2, A). The environmental stimuli

Figure 3. Factual TOD CORES in three Swedish cities by the principal PUBLIC TRANSPORTATION INFRASTRUCTURES: 1) public transportation on streets, 2) completely segregated public transportation; 3) public transportation underground; and 4) partially segregated railways or busways

come though the visual world that is like a sphere around a person and clear everywhere (Gibson, 1986, pp.206). The visual world is represented by isovist with affordances. An isovist is the set of all points visible from a given vantage point in space with respect to the obstacles and voids in the line of sight in one environment (Benedikt, 1979). Affordances show what the urban environments offer to the observer either for good or ill. The environment has a meaning and value to the observer (Gibson, 1986, pp.127).

There are different ways to analyze cityscapes (see serial vision in Cullen, 1961; paths, nodes, edges, districts and landmarks in Lynch, 1960). The method of representation includes a fusion of plan and perspective representation (see Stojanovski, 2013b) to grasp the within and top view. The façades as cityscape frontages are interfaces between streets and buildings and they are represented on the plan by skewed top perspective (Figure 2, B). The skewed perspective allows representing a wider region of the isovist as sphere of environmental stimuli.

When observing, the environmental stimuli come as isovists, a set of affordances (people to talk to, shops to look at, exits to other urban spaces, etc.) towards the vantage point. There are blind regions in the isovist (Figure 2, C1). The routine is either to turn the head rapidly to grasp the sphere of the visual world or choosing vantage points in the urban environment to minimize the blind fields and maximize looks on affordances (Figure 2, C2). The second preposition is that there is a difference in perception between individuals and groups. The group creates a 'collective perception' where the entire isovist is

either jointly perceived by different members of the group or the group becomes 'blind' to environmental stimuli and enters a joint 'flow mode' of conversation (Figure 2, C3)..

An average person feels other people emotions and distinguishes facial expression (anger, happiness, etc.) at a distance between 20 to 25 m (60 to 80 ft.), hears to a distance to 30 m (100 ft.) and sees to 100 m (325 ft.). The line of sight is much longer, but at a distance between 70 and 100 m (250 and 325 ft.) the human figures become individuals and it is possible to notice the person's sex, approximate age and what a person is doing. It is called a 'social field of vision' (Gehl, 1987). The neighborhoods as urban space seldom extend beyond Gehl's 'social field of vision' (Gans, 1968; Appleyard, 1981; Bosselmann et al., 1999). Analogically the TOD CORE extends 100 m from a public transportation stop or a station and corresponds to the 'social field of vision'. It has fluidity properties and stretchy borders depending on the creation of groups of pedestrians that jointly walk, design of the urban environment and interaction with other desirability cores. The exit door of a bus, tram or train is an initial vantage point in the space of a desirability core, but they can elongate in amoebic shape. If a person steps out alone or for the first time (Figure 2, D1), reflective mode of observing space plugs in. In a group, the crowd of people triggers subconscious movement of a person. The mode of observing space plugs in later and the desirability core is elongated in amoebic shape that includes several vantage points. This feeling of 'being in a flow' can be triggered by urban design and attractive inviting frontages (shops, services, etc.) around the public transportation stop or station. The desirability core of TOD can be considered as flows of pedestrians in dispersal (Figure 2, D2) and thought occurrence and arrangement of inviting frontages in urban environments (Figure 2, D3). Both aspects are somewhat related. The inviting frontages create flows of pedestrians though activity.

Urban analysis of TOD CORE zones in Swedish Cities

Cases of principal PUBLIC TRANSPORTATION INFRASTRUCTURES were chosen and analyzed in different Swedish cities. The effect of principal PUBLIC TRANSPORTATION INFRASTRUCTURES on the urban environments in three Swedish cities was analyzed with comparison of the arrangement of inviting frontages in urban environments.

The first row (Figure 3) shows the desirability cores defined by inviting frontages (shops, services, etc.) along tramways on streets in Norrkoping (A1) and Gothenburg (A2). The inviting frontages along the tram lines continue between the stations creating elongated TOD cores that are highly walkable. The frontages and public transportation create lively main streets. The inviting frontages continue sometimes on the side streets, usually where the public transportation stops are. The disadvantage of public transportation on street is the low speed.

The desirability cores along completely segregated railways and busways in Stockholm (B1, B2) show dislocated TOD cores as hypothesized. The desirability cores for train or bus stations on completely segregated railways and busways start when a person exits the station. The completely segregated railways and busways act as barriers in urban space. The desirability cores have amoebic shape and exist on one or two sides depending on the number of exits. Not always a desirability core is created (B2) depending predominantly on the population density around the station. The advantage of completely segregated public transportation is the high speed. The analysis includes only commercial frontages in the historical core around the station in Älvsjö (B1). The area around the station is currently under development and the core will expand in the other direction too.

The subways produce no barriers in urban space (C1, C2). The desirability cores have amoebic shape and start and depend on the number of exits. The advantage of the subways as completely segregated public transportation is the high speed, but the cost are high.

The desirability cores along the (partially segregated railways and busways) LRT in Stockholm (D1, D3), BRT in Gothenburg (D3) are elongated and are in different levels of evolution. The partially segregated railways and busways act as permeable barriers in

urban space, but they. LRT and BRT are usually medians on wide main streets and multimodal boulevards. The research shows that the neighbors do not communicate over wide boulevards (ref). The public transportation is speeder than on streets. The tramway in Enskede, Stockholm does not exist today, but the commercial frontages are there. Their location corresponds with the desirability cores of the historical stations that were positioned with help of photographs from Stockholmskällan (accessible via the web address http://www.stockholmskallan.se/).

Discussions and conclusions

The analysis show somewhat correspondence between the hypothetical URBAN PATTERNS about the TOD CORES represented graphically (Figure 1) and the desirability cores produced by the arrangement of inviting frontages in the building and cityscapes around the public transportation stops and stations in Swedish cities (Figure 3). Some TOD CORES are fully formed (A1, A2, D1) even when the public transportation is defunct (D3) while others are developing gradually (B1, D2).

There is also much research about walking distances from travel surveys. The empirical research of walking distances to public transportation shows that people walk up to 2 km and there are different zones. The number of passengers boarding buses is highest within 100 m from the bus stop in Sydney. In the next zone of walking distances between 100 to 400 m, the number of passengers drops to 60% of the maximum. In the same study the walking distances to the train are always longer than 400 m and the peak is 500 m. The buses serve areas with low uniform density in Sydney, whereas the trains create large transportation nodes with park and ride facilities that are difficult to access by walking (Daniels and Mulley, 2013).

There are accustomed ways to design cities. Architects and urban designers have predominantly used established heuristics about public transportation (walking distances to bus, tram or train) neglecting the the difference within these walking distances. The broad view of URBAN PATTERN as generic codes and on TOD CORES as focus on the interface between form and flow can be understood in a way to mix different urban forms and transportation infrastructures to create larger diversity of urban design solutions.

References

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: towns, buildings, construction* (Oxford University Press).
Alexander, C. (1979). *The timeless way of building*. New York: Oxford University Press.
Amin, A., & Thrift, N. (2002). *Cities: reimagining the urban.* (Polity Press).
Appleyard, D. (1981). *Livable streets* (University of California Press, Berkeley).
Benedikt, M. L. (1979). To take hold of space: isovists and isovist fields. *Environment and planning B*, 6(1), 47-65.
Birkhamshaw, A. J., & Whitehand, J. W. R. (2012). Conzenian urban morphology and the character areas of planners and residents. *Urban Design International*, 17(1), 4-17.
Bosselmann, P., Macdonald, E., & Kronemeyer, T. (1999). Livable streets revisited. *Journal of the American Planning Association*, 65(2), 168-180.
Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream* (Princeton Architectural Press).
Cervero, R. (1998). *The transit metropolis: a global inquiry* (Island Press, Washington, DC).
Cullen, G. (1961). *Townscape* (Architectural Press, London)
Conzen, M. R. G. (1960). *Alnwick, Northumberland: a study in town-plan analysis.* Transactions and Papers (Institute of British Geographers), iii-122.
Daniels, R., & Mulley, C. (2013). Explaining walking distance to public transport: The dominance of public transport supply. Journal of Transport and Land Use, 6(2), 5-20.
Dittmar, H. & Poticha, S. (2004). "Defining transit-oriented development: the new regional building block", in *The new transit town: best practices in transit-oriented development* (Island press, Washington D.C.).
EC. (1990). *Green paper on the urban environment.* EC.
EC. (1997). *Towards an urban agenda in the European Union.* EC
EC, (2011). *White paper 2011. Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system.* EC
Gans, H.J. (1968). *People and plans: essays on urban problems and solutions.* New York.
Gehl, J. (1987). *Life between buildings: using public space* (Van Nostrand Reinhold, New York).
Gibson, J.J. (1986). *The ecological approach to visual perception.* Hillsdale (Lawrence Erlbaum Associates, N.J.).
Florida, R.L. (2008). *Who's your city?: how the creative economy is making where to live the most important decision of your life* (Basic Books, New York).
Kahneman, D. (2011). *Thinking, fast and slow* (Macmillan).
Lynch, K., & Rodwin, L. (1958). "A theory of urban form", *Journal of the American institute of planners,* 24(4).
Lynch, K. (1960). *The image of the city.* Cambridge (M.I.T. Press, , Massachusetts).
Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: dynamics of willpower. Psychological review, 106(1), 3.
Stojanovski, T., Lundström, M.J., and Haas, T., (2012), Light railways and busways as key driver for sustainable urban development: the Swedish experiences with transit-oriented development (TOD). In Proceedings of the the 12th National Light Rail Conference, Salt Lake City, USA.
Stojanovski, T. (2013). Public transportation systems for urban planners and designers: the urban morphology of public transportation systems. In Proceedings of the 3rd International Conference on Urban Public Transportation Systems, Paris, France.
TRB (2004). *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects.* TCRP Report 102 (TRB, Washington, D.C.).
Urry, J. (2007). *Mobilities* (Polity, Cambridge).
Whitehand, J. W. (1967). "Fringe belts: a neglected aspect of urban geography", *Transactions of the Institute of British Geographers,* 223-233.

Chair_Ivor Samuels I Staël de Alvarenga Pereira Costa
University of Birmingham, United Kingdom
Escola de Arquitetura da Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil
Co-Chair_Luca De Vitis I Alessandro Oltremarini
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Form and Theories
Urban Form and Meanings
Reading Urban Form
Urban Morphology Methods
Fringe Belt Analysis

A pattern language for the human-animal interface

Qingyu Gong, Ya Li, Jingzhu Li, Tong Liu, Linlin Wu
School of Architecture, Tianjin University, China
Keywords: urban morphogenesis, pattern language, pattern formation, animal movement, shape grammar

Abstract

Cities are built for human users. They may, however, be habitats for some generalist species despite the known conflicts between humans and animals. To sustain their coexistence for urban biodiversity, this paper explored how and to what extent the morphological elements could shape and, be shaped by animal movements. These elements, comprised of living organisms, constitute a dynamic framework where animals are included and benefited. To develop the framework, we present a pattern language that describes a behavioral process of a focal species in the built environment by linking a set of sequential patterns of human-animal interfaces. To set a pattern of interface, we constructed a four-dimensional array determined by the movement modes and the typo-morphology. The movement modes were defined by velocity distribution derived from the trajectories by performing direct observations. The typo-morphology, stemming from a typology of space shapes, the land-cover types and the environmental factors, was represented by shape grammars. The pattern language was implemented and tested at the observational sites on campus, showing promise as a vehicle for creating an ecologically meaningful urban fabric, and a constructed landform in particular.

Introduction

A pattern describes a distinctive, recursive and relatively stable section of a process. Each pattern embodies a mathematical structure. Sequencing the critical patterns represents a process. The key to pattern formation lies in the rules derived from empirical observations. The rules, which govern the configuration and dynamics of patterns, are called grammars including syntax and morphemes. Thus, a combination of (1) the patterns, (2) the grammars to generate the patterns, and (3) the sequences to link the patterns, constitutes a pattern language. Pattern languages are used to comprehend, control, or conceive a nontrivial process in a way of structural and functional coherence. Although Alexander's pattern language (Alexander, 1977) was grounded in built environments, it has found a limited success in urban and architectural design (Salingaros, 2000).

Patterns that deal with 'entities' rather than 'things' are unintuitive to design with, and how to create the interlocking and overlapping urban form was vaguely described in Alexander's pattern language (Marshall, 2013). Planners tend to extract their own patterns and use them as a template for strategies and guidelines for sustainable development despite the confusions (City of Phoenix, 2013; New York City, 2013). Additionally, Alexander himself acknowledged that the way to link various patterns in the book was rudimentary and elusive (Hopkins, 2010). To articulate the connectivity between the patterns, Salingaros (2000) introduced graphs to visualise the hyperlinks, the interconnections implied in A Pattern Language. Although the links between patterns as interpreted by Salingaros are more clarified, the problems in designing urban form remain unsolved. Numerous attempts at using patterns have resulted in mediocre spaces (Quillien, 2006). Alexander's patterns are priori, arbitrary and opinionated towards the good practices in urban history. These patterns are either case based or highly generalised. More recently, Alexander (2007) enunciated that the 250 patterns in A Pattern Language were special cases of the fifteen fundamental configurational properties in The Nature of Order (Alexander, 2002). This means case based patterns are infinite, therefore mining and documenting more patterns from good practices will not remove the hindrances. The crux is A Pattern Language is not a design method (Salingaros, 2000), which provides a vision without giving a pathway. Beirao (2012) argued that a pattern is a generic algorithmic structure, hence he incorporated shape grammars (Stiny, 1980) as rigorous algorithmic formalisms and urban design generators.

We aim to extend the pattern language from the wisdoms of built environmental design to a method of urban form design. We assume the time, the shapers (Larkham and Conzen, 2014), and the testable observations are essential for the extension. The shift from patterns to morphological unfolding (Alexander, 2002) implies the role of time that plays on built patterns. Likewise, typomorpholgoy focuses on the formation and transformation of built form, in which time is sine qua non. Generally, typology is a study and classification of types. It is, particularly, a study of the logic of aggregation, collective creation and expression of urban fabric of a time and place (Caniggia et al., 2001). This paper embraced both the general and particular senses. In the general sense, typology was used to classify the patterns, where typology was an aid for pattern recognition (Louf and Barthelemy, 2014). In the particular sense, we hypothesise that the two theories--the pattern language and typomorphology—can be unified, if both patterns and types are defined by the underlying processes.

To demonstrate an explicit process in forming a pattern, we used hedgehog, a small, ground dwelling urban mammal as an agent to shape the space we live. We addressed the following questions on how urban fabric was evoked by animal movements, as well as how conflicts between humans and animals in built environments could be mitigated by our extensions of the pattern language. The remaining sections include a general method for morphological unfolding, a prototypical design, discussions and tentative conclusions drawn from the urban design processes.

Methods

Consider a process constructed by discrete time and discrete state space,

$$process=\{S_1,S_2,\ldots,S_{i-1},S_i,S_{i+1},\ldots,S_n\}\ (n\in N), \quad (1)$$

where S_i contains the spatial features at the i^{th} time step. Let *T* be the duration of the process, *t* be the time step, and $T=t\bullet n$. Despite the uncertainty in the process, the possible spatial features throughout the time *T* could be unfolded if the manner of the transition at each step and the initial state are known. Whilst the process may be driven by any moving object, the detection range of the moving object affects the scale of change in spatial features with the shift of each position. And, the movement ability of this object affects the overall extension of space that the object experiences. In this study, we used hedgehog, a small, nocturnal, ground dwelling urban mammal as an agent to shape the space we live. Previous experiments indicated that a hedgehog's perception range R is about five metres (Reeve, 1994). We used this value of R (i.e. R =5) as a measure of morphological elements and a basis for the following work. The resultant form is intended to tailor to the animals who dwell in and pass by our built environments. Although the real trajectories we observed is limited to one species, the shapers as well as the method we extended the pattern language is general.

Animals are often sensitive to transitions in landscapes, thus an edge counts most for animal movement. Moreover, an edge, be it hard or soft, matters to urban form as well. Based on the hedgehog's perception range along with the landscape feature classifications, we classified the edge features into two major classes, namely the point-like edge and the linear edge. We further divided the linear edge into the 'exposed' and the 'sheltered' regarding the feeling of enclosure to hedgehogs and the inaccessibility to humans. For instance, sparse tree canopy, a shade for us, yet is perceived as 'exposed' for hedgehogs.

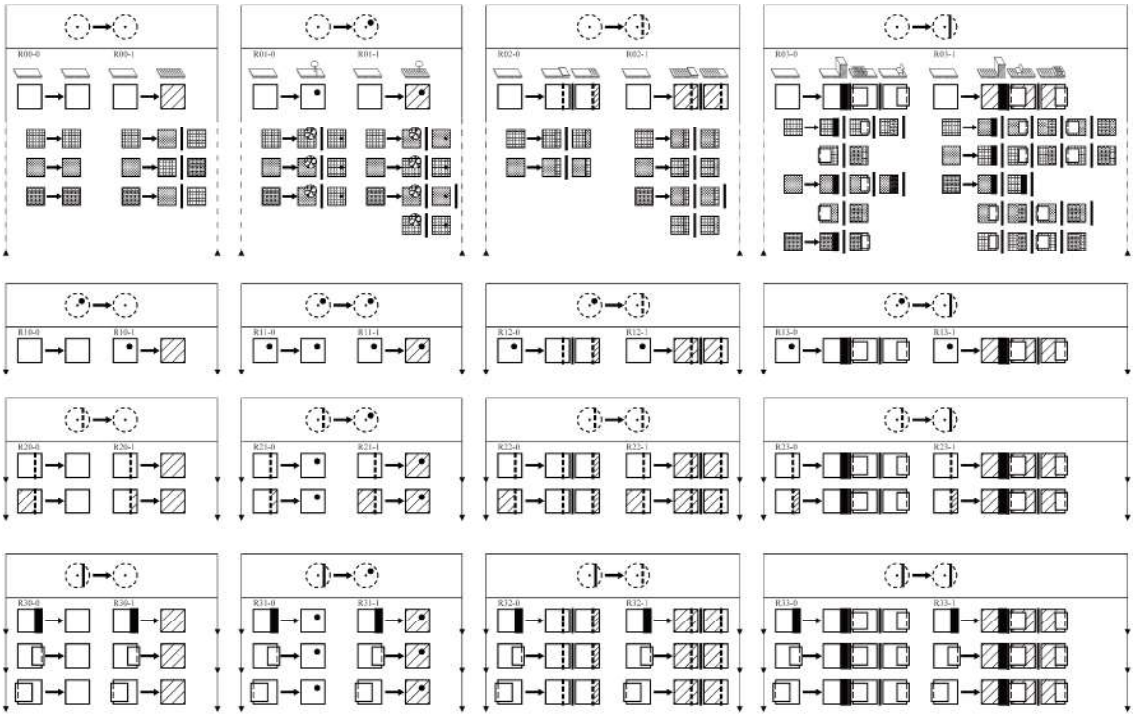
Whether a space defined as 'edgeless' or 'exposed' is determined by the hedgehog's perception range whereas an edge defined as 'point-like' or 'linear' is according to the human scale. Linear edges are literally the changes between landcovers, but they meant more in this study. We regarded the changes in the third dimension meaningful for hedgehogs as 'edges' even though there seems no change in landcover. In light of this, we categorised the linear edges into accessible and inaccessible ones. Aside from the inaccessible ones, we subclassed the accessible ones regardless of the landcover change into the following types: understorey refuges formed by hedgerows, bushes and shrubs; artificial shelters in open spaces such as parked cars and benches; hides against the inaccessible edges on ground floors; and elevation differences shaped by ramps, curbs and gutters. In addition to a rich variety of linear edges, point-like edges such as trees and lampposts also served in part as 'edge' spaces.

Here, we suppose that the spatial features at any time step is derived from its previous time step. We used shape grammars (Stiny, 1980), which themselves contain both syntax and morphemes, to represent the transitions between the time steps in range R. The morphemes in shape grammars are embedded in the subhapes of the left and right hand sides. Thus, each production rule ($Rule_i$) takes the form

$$Rule_i: Subshape_{t-1}\ \emptyset_t \rightarrow Subshape_{t-1}\ Subshape_t, \quad (2)$$

where ∅ is an empty shape at time *t*, and the *Subshape* is a small patch measured by R. The subshape-driven grammar containing the attributes of edges and landcovers was used to simulate the local landscape transitions along a hedgehog's trajectory in a time series. Since only the understorey counts for a hedgehog's behaviour, trees were excluded from the landcover types. Hence, we included three landcover types: (1) streets and pavements, (2) herbs and lawns, and (3) hedgerows, bushes and shrubs. The rule set showing the possible spatial transitions was listed in Figure 1. This rule set was classified by the edge types, each of which was split into four scenarios on the change or persistence of an edge.

Figure 1. A table of rule set of spatial transitions



1402 We estimated the empirical probability *(p_i)* of the changes of edges and landcovers between two successive positions on the movement trajectories. The frequency of the rule application consisted with the empirical probability we estimated. The grammar *(G)*, which contains a set of rules as well as the frequency in application, is accordingly expressed as

$$G=\{(p_i, Rule_i), i=1,2,3,\ldots\}. \quad (3)$$

Driven by the rule set G, the hedgehogs' behavioural patterns were then mapped onto the urban landscapes and produced a fragment of urban form *(uf_i)* such as

$$G: BehaviourPattern_i \rightarrow uf_i \quad (4)$$

Here, $BehaviourPattern_i$ was interpreted by a set of movement modes (*Mv*). Each pattern may involve any of the five canonical patterns, i.e. *getting out, exploring, foraging, nesting, going home*. There were six modes of movements, in ascending order of speed: *hover* (stationary), *dawdle* (very slow), *ramble* (slow), *walk* (normal), *trot* (fast), and *run* (very fast). We estimated the empirical probability (q_i) of each movement mode dedicated to the behavioural pattern. Thus, the set of behavioural patterns is defined as

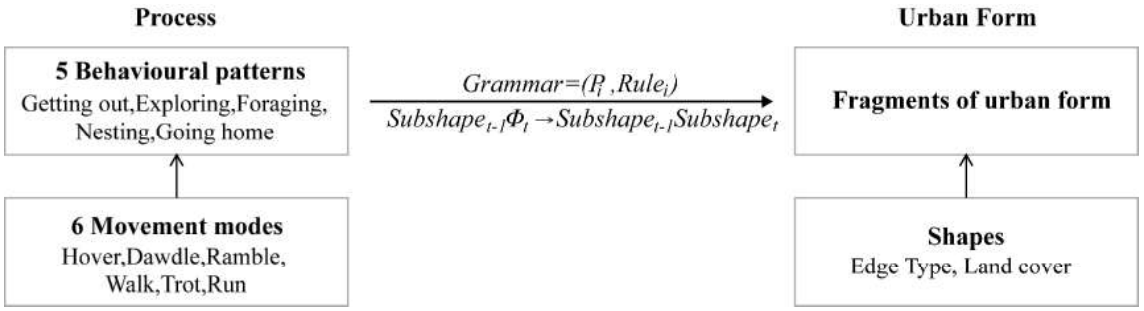
$$BehaviourPattern=\{BehaviourPattern_i, i=1,2,\ldots,5\},$$

each of which is

$$BehaviourPattern_i=\{(Mv_{(i,j)}, q_{(i,j)}) \text{ and } j=1,2,\ldots,6\} \quad (5)$$

Given the speed and deflection angle of an *Mv*, a path induced by the *Mv* can be constructed. In this paper, the value of speed was randomly selected from the speed interval associated with *Mv*, and the deflection was assigned randomly. According to *eq.*(5), we constructed a possible trajectory for each behavioural pattern by linking the paths produced by the *Mv*. Connecting a variety of trajectories produced by various be-

Figure 2. The relationship between the process and urban form



havioural patterns, we gained a process introduced in eq.(1). In light of eq. (4), we finally created a possible urban form (see Figure 2) by merging all possible fragments such as

$$G{:}process \rightarrow U_i uf_i \qquad (6)$$

Forming process

We manually generated the behavioural patterns, and connected and mapped them to urban form via shape grammars. We performed direct observations on two urban hedgehogs and recorded thirteen trajectories comprising 802 positons at five-minute intervals (Li, et al., 2013). One may substitute our focal species (i.e. hedgehog) for other edge-sensitive urban mammals, whereby adjusting the behavioural parameters, e.g. perception range, movement ability, space use, etc. to the corresponding species.

We used a regular hexagon tessellation to describe the hedgehogs' trajectories. According to R =5m, we let the edge of the hexagon be five metres. A hexagon tessellation is superior to a lattice in that their neighbours are indifferent whereas a lattice's neighbours are different between the neighbours on the edges and those at the diagonals. Moreover, regular hexagons are common fractals and readily customised to the objects in an uneven resolution. Each hexagon was evenly divided into twelve right triangles--the morphological units for landscape description. To describe the slowest movement mode when the side of the triangle exceeds the upper bound of the displacement, we overlaid the orthogonal projection of a 3-3 duopyramid on to the hexagon. Here, the displacement is a product of the speed and the time interval, and the speed was assigned randomly within the interval of the movement mode.

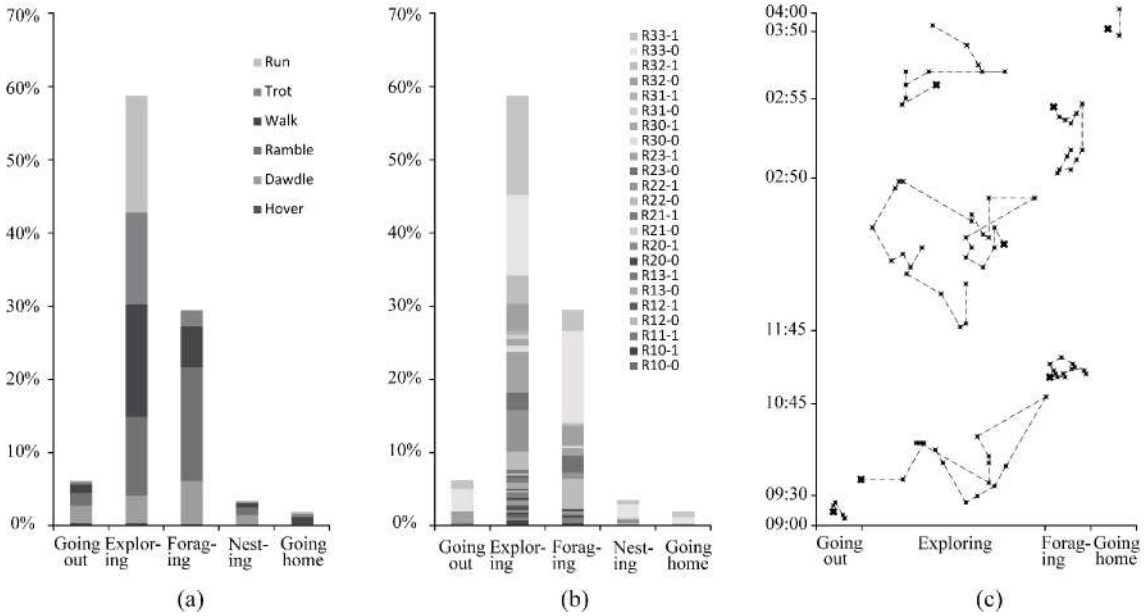
We defined each movement mode by speed: *hover* (<0.05m/min), *dawdle* (0.05-0.5m/min), *ramble* (0.5-2m/min), *walk* (2-5m/min), *trot* (5-10m/min) and *run* (>10m/min). Deflection angles were generalised to $\pm n \bullet 30°$ (n=0, 1,…, 6). We partitioned Figure 3a shows the split of the movement modes over a time spent on each pattern, and Figure 3b shows the empirical probability of edge transitions in each pattern. The deflections exhibited a quasi-uniform distribution when being approximated to 30°, therefore we used random directions.

We constructed a behavioural process composed by four patterns, i.e. *getting out, exploring, foraging* and *going home* with 84 positions at five-minute intervals. We excluded *nesting* mode from the generative sequence, because the nesting mode resulted nearly zero displacement and produced little effect on urban forms. Hence, we proposed a possible sequence such as

Getting out→Exploring_1→Foraging_1→Exploring_2→Foraging_2→Exploring_3→ Going home.

We proportionally allocated the duration of each behavioural pattern. Based on the behavioural pattern, we generated the positions of a possible trajectory on the tessellation (see Figure 3c). Each position on the trajectory was determined by the displacement and the deflection angle derived from the current and previous steps.

Figure 3. Empirical probability of movement modes: a) the split of the movement modes over a time spent; b) the empirical probability of edge transitions, and c) a generation of behavioural patterns on the tessellation



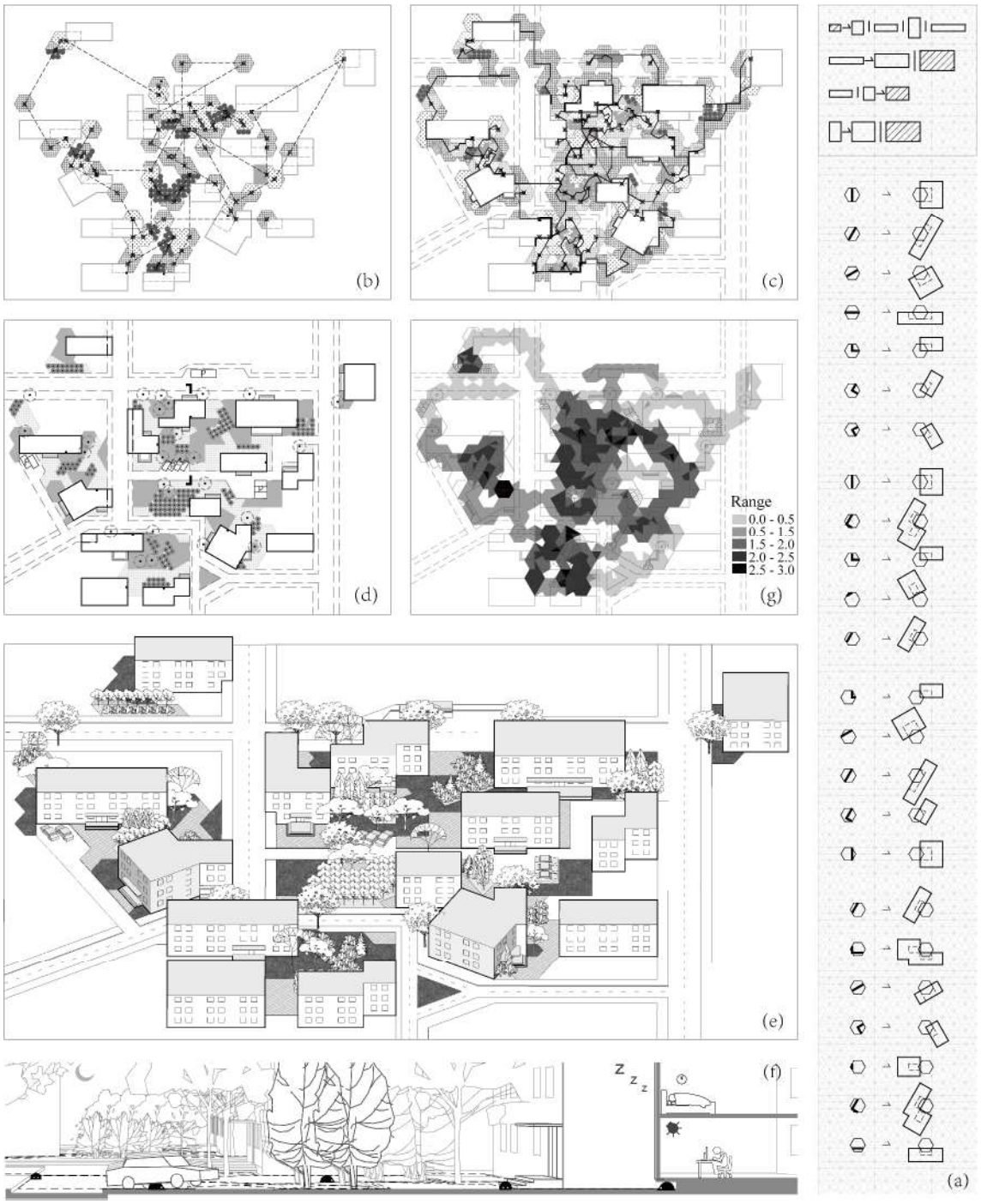
The generation was processed at a duo-temporal resolution. The generation at five-minute intervals established a geometric framework for the one in finer intervals, which in turn, complemented and refined the morphological outcomes of the coarser one from a design perspective. The generation in the five-minute intervals was conducted in two stages to avoid the cumbersome adjustments against the overlaps and conflicts at spots congestions.

Stage 1 generated the edge types. We located the point-like and linear edges onto the tessellation. Approximately 70% of the edges occurred within one-metre according to our observations. The overlapped shapes containing the same type of edge could share a same edge. In this case, the edge was picked out optionally. We applied the shape rules for edge transformation in sequence (*e.g. Rule32, Rule21, Rule12, etc.*).

Stage 2 generated land cover types. The land cover type was determined by both its previous position and the production rules. Whenever a conflict was detected, we returned to stage 1 to adjust the edges in the aspect of configuration. Each rule comprised a set of sub-rules, and each sub-rule contained a compound of specific spatial features. To structure the shape patchworks towards a functional urban form, we then configured the streets and buildings implied by the edges and landcovers we generated (see Figure 4b). We also defined the architectural grammar to illustrate how buildings emerged from the generated edges. Building shapes grew out of a set of basic rectangles that transformed upon the detection of the linear edges on the tessellation. The growth terminated when encountering previously generated positions or edges, or exceeding a normal building size. (see Figure 4a).

Subsequently, we generated the trajectory between the positions of displacements based on the experience learnt from observations. The fractal tessellation was particularly useful for creating the pathways for foraging pattern. We generated the new shapes at each position where the direction changed. More details such as trees, steps and holes of buildings were added to render the generation results. Any conflicts caused at the finer level generation should not resort to the coarser level for adjustment (see Figure 4c). Finally, we polished the patchworks containing all shapes. Figure 4d-4f and 4e present a prototypical design for urban form generation. If one applies this prototypical design to the real world, the tessellation shall be adapted to the existing fabric. The proposed trajectories should normally avoid crossing water bodies.

Figure 4. A prototype of urban form design generated at a duo-temporal resolution via shape grammars: a) architectural grammar to emerge buildings from edges; b) the generation with five-minute intervals; c) the generation with finer intervals; d) the design plan polished from shape patchworks; e) a 3D expression of the prototype; f) a part of cross-section showing the human-animal coexistence; g) the distribution of overlapping levels



To visualize the human-animal interface, we introduced an overlapping factor denoted η to measure the spatial and temporal overlaps of the uses between the focal species and humans. We presumed that both the area and duration of the animal occupancy in built environments were proportional to the level of overlaps. Given the equal area of the morphological unit (described in triangle), the level of overlaps was in proportion to the time occupied by the animals. We then calculated the overlapping levels by letting η =1, 10, 40, 100, 200, and ∞ in a reverse order corresponding to the six movement modes from *run* to *hover*. The level of overlapping for every triangle was obtained by summing up the time that an animal travels through or between the triangles. Figure 4g maps out all triangle's overlapping values in the logarithmic scale with base 10. The areas in the overlapping ranges of high (2.5-3) and median to high (2-2.5) suggested the priorities for the interface design, e.g. the stepping stones in built environments.

The generated urban form is related to the movement ability of the focal species and the temporal resolution in which one performs the observations. An insufficient temporal resolution leads to inadequate clues to design while an unnecessarily high resolution causes redundant shape transitions in design. For a less mobile animal such as hedgehogs, using a finer temporal resolution rather than the five-minute interval we used will be preferable. The resulting form is incomplete, yet restricted to the places that a hedgehog perceived and used. Nevertheless, this incompleteness will not hinder our extended pattern language from being an urban design method, because one can assume that a more complete generated form is achievable through a longer time during which a number of individuals move and disperse.

The randomness of parameter assignment and the manner of subshape transitions invoked an unavoidable uncertainty in the generative process apart from the assumptions on the sequences in behavioural patterns and movement modes. First, the deflection angle was approximated to a multiple of 30 degrees and showed insignificant differences in probability therefore assigned randomly. The uncertainty also occurred when we transformed the generated positions to the edge or edgeless features, as well as to the soft or hard edges. Second, the uncertainty was caused by the grammar rules where the current shape was exclusively determined by its previous step. Third, the path generated in a finer (than five-minute) interval was relied on the designer's intuition gained from the observations. The random variables including the speeds, deflections and subshapes, which we assumed independent for generating the paths and shapes, could be correlated. The autocorrelation should be checked in future work.

Conclusions

We show that the pattern language we extended is a workable design method for urban form generation. The idea to define the patterns and the pattern language in our paper are general, in which the time and the shaper are explicit. To map the behavioural patterns onto the urban form, shape grammars were used to ensure the coherency in generating urban fabric under a common process.

Using a living organism as a shaper of urban form, one is able to relate spatial features with a time series, and generate a possible urban form fit for urban organisms other than humans. Our observations demonstrated that 95% of positions in the five-metre perception range contained edges and 70% of those contained edges in one metre. Our findings highlight that the types of the edges are particularly rich in built environments, and count for urban mammals and humans as well. Our method shows promise as a vehicle for creating an ecologically meaningful urban fabric.

Behavioural patterns are invisible regularities reflected in the forming process. Our typology of patterns is process-based, which coincides with the doctrines of the morphotypology, and suggests a potential of unifying the two theories.

Acknowledgement

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References

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: towns, buildings, construction* (Vol. 2). Oxford University Press.

Alexander, C. (2002). The nature of order, book 2; the process of creating life: an essay on the art of building and the nature of the universe (Center for Environmental Structure, Berkeley).

Alexander, C. (2007). 'Empirical findings from the nature of order', *Environmental and architectural phenomenology newsletter,* 18(1), 11-19.

Beirão, J. N. (2012). 'CItymaker–designing grammars for urban design, architecture and the built environment', PhD thesis, Delft University of Technology, Netherland.

Caniggia, G., & Maffei, G. L. (2001). *Architectural composition and building typology: interpreting basic building* (Vol. 176) (Alinea Editrice, Florence).

City of Phoenix (2013) *Transit Oriented Development Strategic Policy Framework* (https://www.phoenix.gov/pddsite/Documents/pdd_pz_pdf_00380.pdf)

Hopkins,R.(2010) *Transition as a Pattern Language* (https://sheffield.indymedia.org.uk/2010/06/453429.html).

Larkham, P. J. and Conzen, M.P. (2014). 'Agents, agency and urban form: the making of the urban landscape'. in Larkham, P. J. and Conzen, M. P. (ed.) *Shapers of Urban Form: explorations in Morphological Agency* (Routledge, London) 28-54.

Li, J., Li, Y and Gong, Q. (2013) 'Spatial preferences of translocated hedgehogs (Erinaceus europaeus): impacts from and reconfigurations for a fine grained built environment', *Urban Environment and Urban Ecology* 26(5), 11-15 (in Chinese).

Louf, R., and Barthelemy, M. (2014). 'How congestion shapes cities: from mobility patterns to scaling', *Scientific reports*, 4.

Marshall,S.(2013) 'Complex Design, Creative Challenge and Cognitive Constraint: Experience of Students' Use of A Pattern Language' Paper presented at Conference of Complexity, Cognition, Urban Planning and Design, Delft, Netherland. Retrieved from http://www.bk.tudelft.nl/fileadmin/Faculteit/BK/Over_de_faculteit/Afdelingen/Urbanism/Onderzoek/Congress,_workshops_and_exhibitions/Congresses/CCUPD_conference/Short_paper_Marshall.pdf

New York City Department of Transportation (2013) Street Design Manual (http://www.nyc.gov/html/dot/downloads/pdf/nycdot-streetdesignmanual-interior-lores.pdf)

Quillien Jenny (2006). 'Grasping the Ineffable: From Patterns to Sequences', annual meetings of the International Association for Environmental Philosophy in Philadelphia. (http://www.arch.ksu.edu/seamon/quillien_Alexander.htm)

Reeve, N. (1994). Hedgehogs. (T. & AD Poyser, London) 34-53.

Salingaros, N. A. (2000). 'The structure of pattern languages', *Architectural Research Quarterly*, 4(02), 149-162.

Stiny, G. (1980). 'Introduction to shape and shape grammars', *Environment and Planning B: Planning and Design* 7(3), 343-351.

Milano Verde, order against disorder

Francesco Menegatti
Politecnico di Milano, Italy
Keywords: Rationalism, Pagano, Milano Verde

Abstract

Studying the "the Milan verde" project means to investigate the relationship that existed between Milan and the rational city. Milano verde is primarily a program, a "tool of logical arrangement of data and goals" and also a diagram that is the "transition from the organization needs to which give an answer, assured by the program, to the formal polarization level". The most significant lesson, that the rational Italian city communicates, concerns the possibility of the urban project to be configured as a compact intervention, well defined, as the alternative to the contemporary city dispersion. Despite the project has a great expressive energy and arrangement, the"Milano Verde" should not be listed among those urban plans in which predominates the idea of tabula rasa, an idea that has characterized many European projects of that time, but a urban project whose medium intensity, does not retract in some ways to a direct confrontation with the city and allows to convincingly modulate the transition between the two urban systems making them coexisting on the common matrix settlement imposed by Milan. In this meaning sets the difference between the idea of the city rational and the Italian rational cities. The Milano Verde" project was entirely rebuilt in digital form following a critical drawings of architects made in 1938 (Franco Albini, Ignazio Gardella, Carlo De Carli, Giuseppe Pagano, Giancarlo Palanti, Giangiacomo Predaval, Giovanni Romano). The was presented at the Milan Triennale the same year. "Milano Verde" is urban project that for many architects has become a constant reference in his work and in the idea of the shape of the city thought.

This presentation relates the results of a study on the project "Milano Verde" an urban expansion planned in 1938 for the Milano Fiera area, designed by Franco Albini, Ignazio Gardella, Carlo De Carli, Giulio Minoletti, Giuseppe Pagano, Giancarlo Palanti, Giangiacomo Predaval, Giovanni Romano.

The project is an urban design for a large-scale development of Milan and represents an emblematic case in the urban rationalist planning period in Italy.

The importance of "Milano Verde" also concerns Giuseppe Pagano, a great figure in our architectural culture which, as Ignazio Gardella confirmed, in an 1992 interview, is a considerable dominant figure among the other architects both for the political role that he had in those years and the ideological support he gave to the project through the articles written on Casabella pages. There are some essential points for the study of "Milano Verde":

the first is that it is the promoter was Giuseppe Pagano and he identifies an opportunity "to design a new district in the city" into the Sempione Fiera area. The second point concerns the characteristics of the project: "Milano Verde" is "a program rather than a project" in which had been summarized some basic principles of the rationalist thought. The third is the role of the Trionfale street on which, by the testimony of Gardella, the group had strived more than anything. Finally the fourth point is that the project was a "manifesto" and was presented on the pages of "Casabella" by Giuseppe Pagano with a promotional item entitled: "The order against the disorder."

Pagano writes: "The order (...) is the representation of the elementary intelligence; It assumes the value of a civilization measure; It ends in a conscious rational aspiration to balance of forms and ideas, towards that plastic and intellectual harmony, spiritual and functional that wants to solve itself the simplest and the most complex, the primary and the complicated, the primordial and the evolved. This irresistible need for order is the clearest and the most important mission for civilized man."

There are few dissertation on the project that remains for a long time confined within a "fascist regime" production which in fact is not a direct expression of it and on the contrary it will be the "regime" the that will appropriate the new instances of rational architecture.

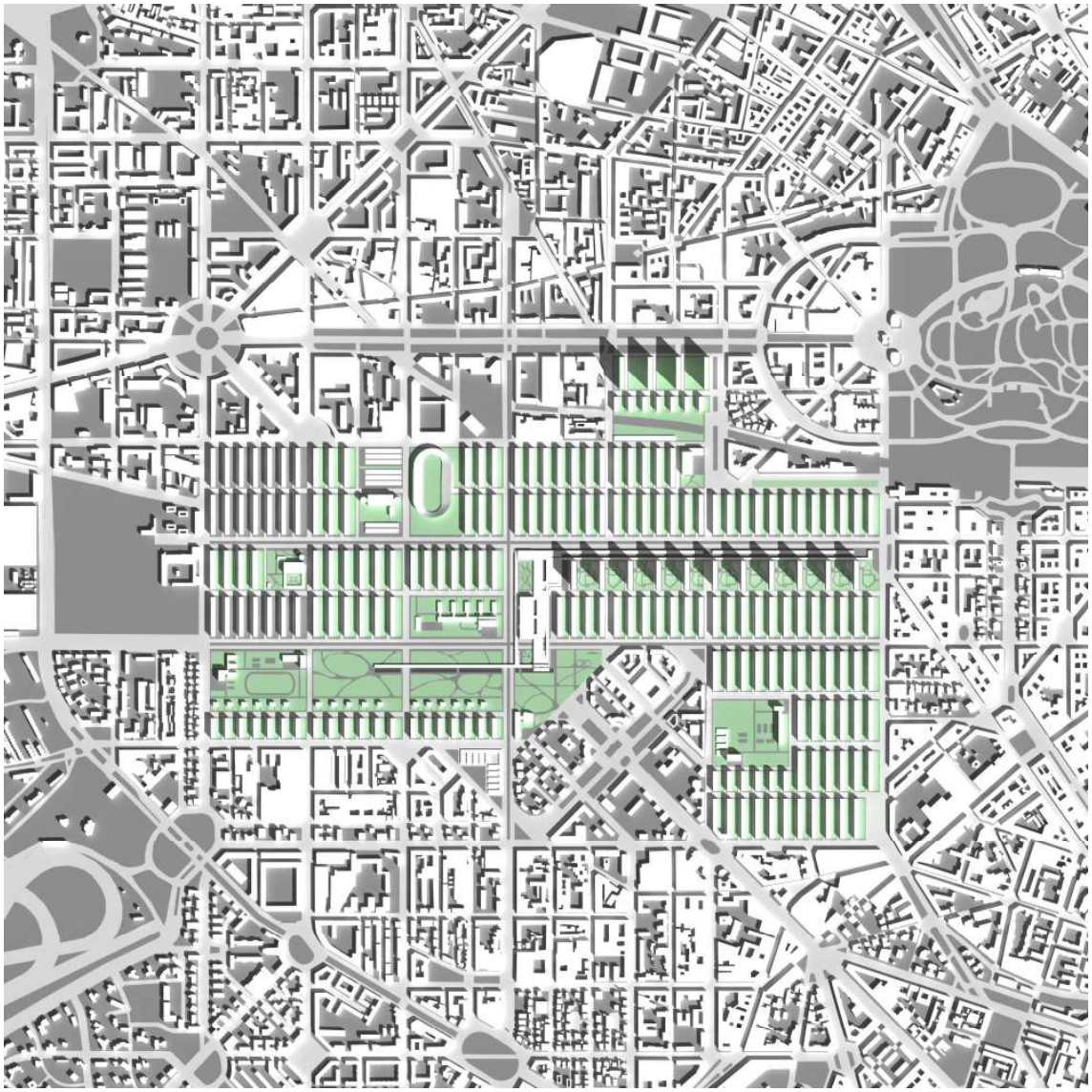
The Casabella review 195/198 number, dedicated Giuseppe Pagano memory, collects the writings of many who knew him, among these there especially are Giulio Carlo Argan, Giulia Veronesi and Ernesto Nathan Rogers that are telling us more about the Pagano temperament and his relationship with modernity and tradition, "while introducing the political inside the art matter, however, it was one of the clearest voices of our consciousness of architects."

Plans for Milan

Aldo Rossi in a significant contribution in the knowledge of the urban history of Milan: "If we look at a Milano map we can see that the nucleus of the Roman Milano was in the area that corresponds to the current Piazza San Sepolcro; and we note that the progressive expansion of the city, which lasts till this day, was in the north-northeast direction and on the contrary to what is usually said Milan does not grow like an oil spot into the water but it develops in a very different structure: we have the durability of the center of the Roman city, which has a monumental structure, housing and social, being constituted this, as I said, from the Roman people, by the captains and authorities; then we have the first craft settlements and the first industrial activities, which develop in the villages. Ignazio Gardella says that the main idea strongly structuring the 1945 AR plan are the two urban axes that suppose that the new city expansion will proceed towards satellite urban nucleus around the ancient center. The axis of the Triumphal road could be understood as the AR plan antecedent.

The district has its center in the axis of the Trionfale street, along which lines up the tower buildings.

Figure 1. Milano verde, planivolumetric view, author's drawing



In the project report a substantial part is dedicated to the correspondence of quantity and use, to the separation of functions and the correct amount of allocation of this two parts of the project.

The typological elements of the project are precisely calculated and divided into types and functions: there are three types of residential buildings, high twenty-storey building arranged in the proximity of the elevated terrace; a six-storey building that make up the bulk of the project, and, finally, the three storey villas, located within the park. Other types of buildings, such as the villa and the "palazzina", are destined to other areas of the project, representing the minute size which articulates and makes the whole system less peremptory.

The twenty-five meters spacing that separating the lower buildings guarantees, even during the the winter period, a good penetration of sunlight even on the lower floors.

The part dedicated to the shops, is concentrated along the via Trionfale: "(...) we wanted to give a special character to this important artery that should mark a straight access to the future Fiera di Milano." Along this axis are arranged the higher residential buildings, massive buildings. "(...) a rhythmic row of tower buildings 73 meters high with 20 floors." These

buildings give the structure and the hierarchical organization of the district through two consequential figurative orders, the first as we said is a planimetric, the second is, consequently, the one that regulates the height of buildings. If the six-storeys buildings determine the true iconic mass of the plan, structuring the district from this point of view, the highest volumes of the taller buildings determine a hierarchical variation made by altimetry.

The Contrast given by the building sequences and highness generates a intense urban vision and in its form, by using these two parameters seems that the architects was looking to the north-european dimension of the urban shape giving to the "Milano Verde" project a metropolitan dimension.

The distance between the buildings and the rhythm of the volumes are a dominant dimension in the design, this distinguishes immediately this new settlement from Beruto Milano Plan (1884).

The serial device, implemented by the architects, has functional reasons determined by the desire to offer the same characteristics of sun radiation in all living units.

The project of the new district is made by continuous dimensional and spatial echoes, as a product of a series of void volumes and dense volumes that produce different rhythmic sequences, constant highness and sudden growth.

The complexity of the elements of the new district its regulated in its deep structure by the figure of the great elevated square, thought on a regular mesh of pillars as a continuous horizontal surface, in which the social life of the entire district might took place.

So the square is the focus of the project from which irradiates a great figurative energy.

"The upper part, inaccessible to traffic, will represent an audience completely isolated from traffic and it will be a meeting place for the new district. To complete the social and the *aulic* character of the square are provided ... a coffee, a movie theater ... ... a public loggia ... ".

The idea of the elevated square has a functional meaning but it is also the demonstration of a spectacular and highly suggestive space , as it emerges from a reading of Giulio Carlo Argan.

This is an area of the urban project that its dominated by the great majesty of the buildings that surround it, this enact the most intense representation of the whole district: "... with a active and sparkling modernity of its houses, can be transformed, on special civilian and military occasions, in the true Via Trionfale of a new Milano".

A fundamental issue for the understanding the redesign of the "Milano Verde" is the link between the rationalist project of the city and nature.

A Planimetric description of the area shows which are the part of the new district destined to green areas.

The streets in the green areas between the residential buildings, for example are sinuous, made by of curves which constitute a web paths of small streets and parking areas, this make us realize how important it was the open spaces theme for the entire composition.

The largest spaces are used as public parks and are characterized by different non linear routes marking the distinction between artificial and natural territory.

The function of the green areas is also to solve functionally the thermal regulation of all the buildings in the new district, the regular rows of trees integrated into the residential plot are used to repair solar radiation during the summer, leaving filtering the light during the winter.

The green is distinguished in private green and public green, where the project also considered large artificial lakes and decorative pools that follows the promenade.

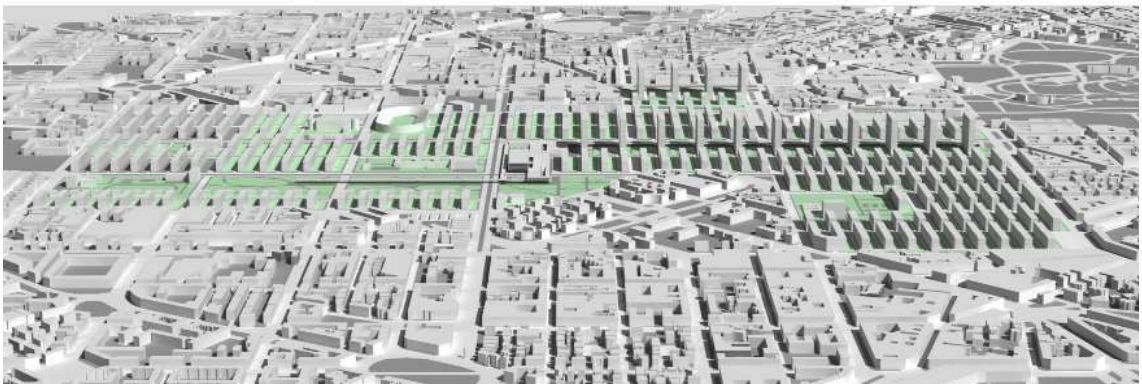
In this case clearly emerges the natural metaphor alluded by Purini of the "Milano Verde"project, the image of a forest, expressed by the columns forest as iconic essence of what can be understood as an idea of the original Italian landscape.

The role of nature in the project of "Milano Verde" also includes the relationship with the landscape that surrounds the city of Milan.

Long prospective determined by straight large roads accompanied by regular sequences of residential buildings that sets the masses of the mountain that surround the northern part of the city.

The final image of the project for "Milano Verde", could be associated the reality and the substantiality of Lombardia landscape that surrounds Milano, an open territory

Figure 2. Milano verde, view from west to east, author's drawing



disseminated by sequences of cultivation of arboreal masses of poplar and from web of irrigation canals that draws its deeper structure.

From the morphological point of view we can not define the project simply as a program.

If the program is a "tool of logical arrangement of data and goals" and the plot is its "formal polarization", "Milano Verde", morphologically holds both the definitions.

In this the architecture Italian confirms a specific attitude: "... highly experimental but without the demonstrative abstraction frequently polemical of a research made for the research".

A more human dimension, where a domestic feeling pervades its representation, making the project pragmatically and operationally plausible, programmatically feasible.

The rhetoric of the rationalist project has to deal with medium size of Italian way to intend the architectural project which "..saving the Italian cites to become true metropolis and still maintaining an operational dimension".

The logical construction of the project is expressed in the perspectives and in the "volo d'uccello" drawings that describes this new dimension.

It seems clear, therefore, how the "Milano Verde"project is more and more far away from the German models of vertical city by Ludwig Hilberseimer and closer to what will be its direct future, the postwar reconstruction.

In this sense, "Milan Verde" does not belong anymore to the urban history which was described by Aldo Rossi, the morphological size of the project is unprecedented in the expansion of the city, is not a defined figure as in the plan fon the Napoleon Bonaparte forum and the the Lazzaretto convent.

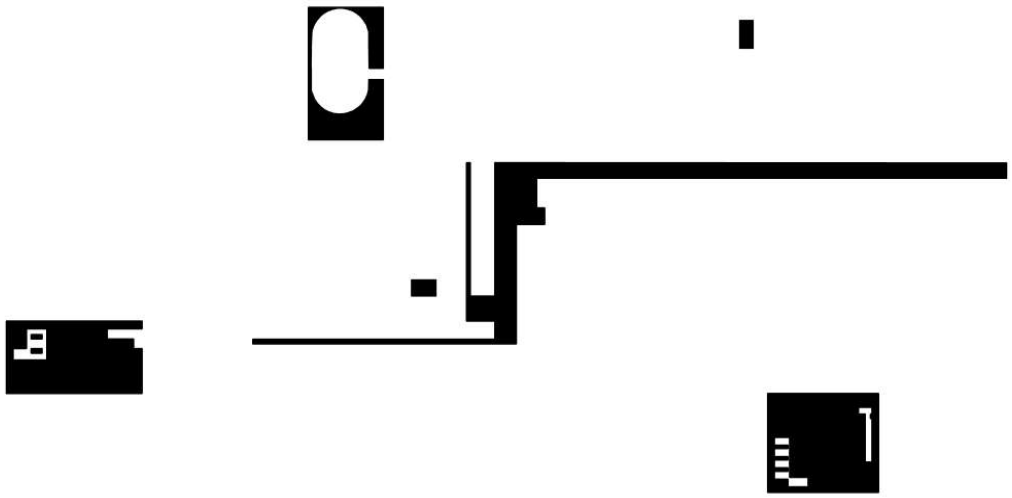
"Milano Verde" does not presuppose a city and a territory structured through poles, but a continuous unlimited and fuzzy city .

In this dimension is far from what Aldo Rossi writes: "Instead of the medieval aspects of the city, the adhesion of Piermarini to the Milan architectural environment was given by the figures of Tibaldi and Richino - coming from the renaissance the first, baroque the second, but both original creators provided of a powerful, precise and adeguate language, structurally correct and rational in its general approach, able to support with authorities the rationalist thematic whose Piermarini was great interpreter in Milan."

The urban structure of Milan "Milano Verde" follows the subdivision of the Beruto Plan, where this subdivisions are prolonged in the redesign.

The nineteenth-century structure of the Lombard city, on the contrary, is evidenced by transcription of the new urban sequence.

Figure 3. Milano verde, public spaces and green's diagrams



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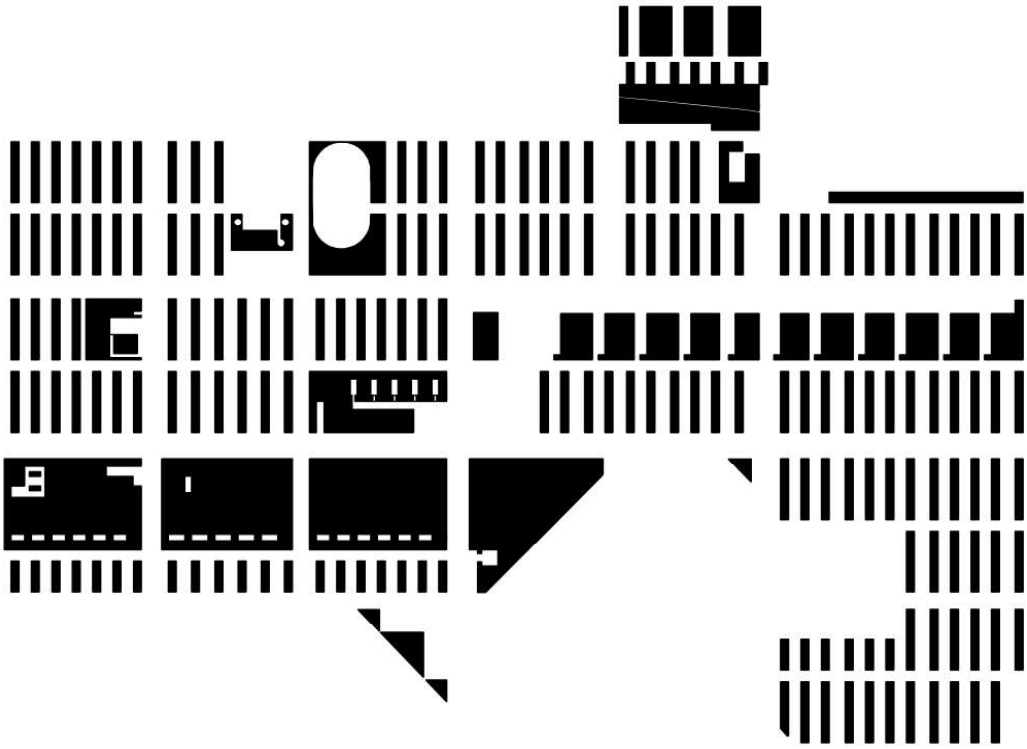


Analyzing the plan of the city we can observe how "Milano Verde" is surprisingly in continuity with the size of other great figures that characterize the urban plot, but nevertheless does not assume the delimited and concluded formal character.

In the existing roads sequences that goes parallel to Corso Sempione, the road access is defined in continuity with pre-existing axes, which are the reflection of the roads of the new district: Via Giovanni da Procida, via Machiavelli, Via Vincenzo Monti, Via Monte Rosa, and this rules also are valid for their orthogonal.

The model determined by the Beruto urban design, the square block that characterize this part of the city, is confirmed and reinforced in the project "MilanVerde" as the basis of the whole composition, a rigid structure of road on which is fixed the whole rhythm of the new buildings.

What is discarded is, however, is the idea of the closed block.

The courtyard typology is judged to be overcome to a composition made by the rows of the new buildings.

The project reaches the final definition through successive stages, stages that consider the replacement of entire sections of the city to make becoming true the new idea, the new organization of the space.

The public lodge polarity is located exactly at the intersection between via Domodossola and via Vincenzo Monti, the Trionfale street corresponds to the Cardus Romanus.

The Digital rendering

The rendering of the project was orineted by two characteristics of the digital instrument: the first relating to the planimetric "Milan Verde" drawings, redesigned by graphics digitizing software in an two-dimensional environment; the second that has translated these drawings into volumes, the generation of a three dimensional model of the project was the base from which I obtained all perspective views which illustrate it.

The two-dimensional design is extremely clear, through a careful selection of the signs that compose it and through the elimination, just like in a written text, of few typos that a work done by many hands inevitably had in most parts of the project.

The main goal of the two-dimensional drawings, was to make the text immediately readable, to ensure the immediate understanding of the hierarchical order that give the rules to all the composition the planimetric organization.

In the road section that divide the residential blocks I highlighted the relevance of the green areas and, where it was possible, I have accurately reproduced the paths that defines a web of free signs in opposition to the strong set of the project.

As in the two-dimensional representation, I wanted to remove any information that could create a diversion from general urban drawing, so, even in the three-dimensional rendering of the project, I preferred an accurate and concise representation, but not omitting those details that are necessary to specify all parts of the project.

The images of three-dimensional restitution wants just describe the architecture of the project.

Erasing all the information concerning the presence of humans and the nature, I wanted to highlight how the architecture does not have the necessity to have a term of comparison to represent itself. The "Milan Verde" architecture tells about itself independently in his proportions, in its intimate relations and calibrated sense of measure, without any other reference point outside its architecture.

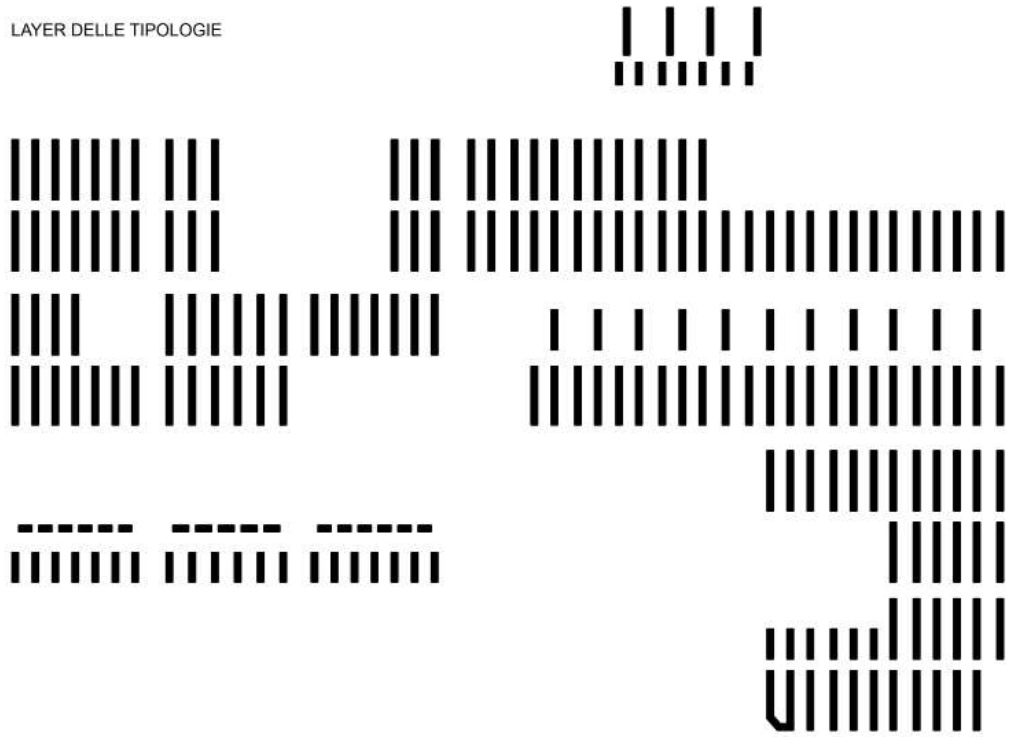
The voluntarily adopted laconic representation, helped me to confirm all the Italian architecture characteristics, referring to the points described by Franco Purini.

The drawings I have chosen shows "the full consciousness and concluded of the form meaning", the buildings around the project have their own capacity to be autonomous and singular, able to reveal oneself as perfect volumes, as objects naturally provided of an own capacity to persist.

The outlines of the buildings are printed on the background of the building rhythmic plot, confirming their ability to dominate the perspective space built around them.

I tried to emphasize the tectonic and spatial features of each part of the project and,

Figure 4. Milano verde, Typologies and furnitures's diagrams



by using the central perspective I've tried to give to the viewer a constant visual reference into these images, a continuous horizon from which the entire image could be reconstructed entirely.

The central perspective is a dogmatic representation this is necessary to describe the urban plot in its entirety and finiteness.

I thought that the way I've represent my drawings as if we were inside that boundary condition, given by a project that is constantly working on a double semantic register, the one of the singularity of the elements that compose itself, and the finiteness of the whole, trying not to emphasize never one side over another.

The project offers itself as a fact with its obsessive rhythms, its spatial compression, some misalignment of the residential blocks that establish its settlement, the holes that unexpectedly opens between the houses. In the renderings the blocks were deliberately scratched by darker lines to link an abstract way to represent to some well detailed views.

References

Batty, M. (2008) 'The Size, Scale, and Shape of Cities', *Science*, 319 (5864), 769 – 771.

Berghauser Pont, M. and Haupt, P., 2010. *Spacematrix. Space, density and urban form* (NAi Publishers, Rotterdam).

Berghauser Pont, M. and Marcus, L. (2014), 'Innovations in measuring density: from area density and location density to accessible and perceived density'. *Nordic Journal of Architectural Research,* 2, 11-31.

Berghauser Pont, M. and Marcus, L. (2015) 'What Can Typology Explain That Configuration Can Not?' *Proceedings of the 10th International Space Syntax Symposium* (forthcoming).

Gauthier, P. and Gilliland, J. (2006) 'Mapping urban morphology: a classification scheme for interpreting contributions to the study of urban form', *Urban Morphology*, 10(1).

Greene, M, Reyes, J, Castro, A. (2012), *Proceedings of the 7th International Space Syntax Symposium* (Pontefica Universidad Catholica de Chile).

Hillier, B. & Hanson, J., 1984, *Social Logic of Space*, Cambridge University Press.

Hillier, B., 1996, *Space is the Machine*, Cambridge University Press.

Hillier, B. (2003) 'The Architectures of seeing and going: Or, are Cities Shaped by Bodies or Minds? And is there a Syntax of Spatial Cogni¬tion?' *Proceedings of the 4th International Symposium in Space Syntax*, UCL London, 06:1-34.

Hillier, B. and Iida, S. (2005), 'Network and psychological effects in urban movement'. *Proceedings of the Fifth International Space Syntax Symposium*, Delft: University of Technology.

Koch D, Marcus L, Steen J, 2009, *Proceedings of the 7th International Space Syntax Symposium* (Trita-Ark KTH).

Kropf, K. (2009) 'Aspects of urban form', *Urban Morphology*, 13(2), 105-120.

Kwan, M-P. and Weber, J. (2003) 'Individual accessibility revisited: implications for geographical analysis in the twenty-first century', *Geographical Analysis*, 35, 341-353.

Larkham, P.J. and Morton, N. (2011) 'Drawing lines on maps: morphological regions and planning practices', *Urban Morphology,* 15(2).

Marcus, L., Berghauser Pont, M., Gren, Å. (2014) "Can spatial form support urban ecosystem services: Developing descriptions and measures to capture the spatial demands for pollination using the framework of space syntax", *ITU A/Z,* 11:2, 255-270.

Marshall, S. (2012) 'Science, pseudo-science and urban design' *Urban Design International,* 17, 257-271.

Martin, L. and March, L. (1972), *Urban space and structures* (Cambridge: Cambridge University Press).

Moudon, A.V. (1992) 'Getting to Know the Built Landscape: Typomorphology', in K. Franck and L. Schneekloth (ed.) *Ordering Space: Types in Architecture and Design* (Van Nostrand Reinhold, New York) 289-311.

Moudon, A. (1997), 'Urban morphology as an emerging interdisciplinary field' *Urban morphology*, 1, 3-10.

Netto, V., Sabayo, R., Vargas, J., Figueiredo, L., Freitas, C. and Pinheiro. M. (2012), 'The convergence of patterns in the city: (Isolating) the effects of architectural morphology on movement and activity'. *Proceedings of the eighth International Space Syntax Symposium* (Santiago de Chile: PUC).
Peponis, J. (2014) 'Investigative Modeling and Spatial Analysis: A commentary of directions', Paper presented at the Research Workshop at KTH, part of the project RIBS, FP7/2007-2013.
Ratti, C. (2004), 'Urban texture and space syntax: some inconsistencies'. *Environment and planning B*, 31, 487-499.
Steadman, P. (2013) 'Density and built form: integrating «Spacemate» with the work of Martin and March' *Environment and Planning B: Planning and Design* 40, 341 - 358.
Ståhle, A. (2008) *Compact Sprawl: Exploring Public Open Space and Contradictions in Urban Density* (Stockholm: KTH dissertation).
Talen, E. (2003) 'Neighborhoods as service providers: a methodology for evaluating pedestrian access' *Environment and Planning B* 30 (2), 181-200.
Whitehand, J. (2012) 'Issues in urban morphology', *Urban Morphology*, 16(1), 55-65.

Connectivity, density and built form: integrating ´Spacemate´ with space syntax

Meta Berghauser Pont, Lars Marcus
Chalmers University of Technology, Department of Architecture, SE-412 96 Gothenburg, Sweden
Keywords: density, network modelling, urban form, Spacemate, Space Syntax

Abstract

The Spacemate diagram developed by Berghauser Pont and Haupt (2006, 2010) relates together four geometrical properties of urban fabrics: density expressed as floor space index (FSI), ground coverage or ground space index (GSI), spaciousness expressed as open space ratio (OSR) and number of storeys (L). The authors measured these variables in a sample of Dutch, Spanish and German residential estates and showed how Spacemate segregates the buildings into distinct morphological types. Steadman (2013) brings this piece of work together with the work of Martin and March (1972) and shows how Martin and Marchs analysis can provide further theoretical explanation for Berghauser Pont and Haupts empirical findings.

The morphological descriptions as developed by Berghauser Pont and Haupt combine the tradition of urban morphology to capture what Conzen and Muratori called the citys genius loci (Moudon 1997) with the more quantitative approach that started at the Centre for Land Use and Built Form Studies in Cambridge during the 1960s and 70s. Although Spacemate is an ingenious and useful graphical tool for urban morphological studies (Steadman 2013), we argue in this paper that it lacks a description of the relative or systemic dimension of cities, that is the description of relations between elements, to effectively understand the relation between urban form and the functioning of cities. To arrive here, Space Syntax (Hillier and Hanson, 1984), will be integrated with the morphological descriptions used in Spacemate.

Introduction

From a design theoretical perspective two aspects are important to the generation of new design proposals and a successful design process (Hillier, 1996; Moudon, 1992). Firstly, generative or utopian theory is an essential prerequisite where a typical case in point is the writings of Jane Jacobs, which, notwithstanding the immense insights conveyed lack scientific foundations. This is not uncommon in theory in urbanism and is the reason why it has been called a pseudo-science (Marshall, 2012). The problem is that equally essential for the design process is analytical theory that concerns the actual effects of new proposals, or, its *performativity*, which typically is far less developed. Gauthier and Gilliland (2006) classified urban morphology studies to distinguish these two poles with on the one hand more generative, utopian or as they call it, normative-prescriptive studies and on the other hand analytic, descriptive or following Levy's (2005) terminology, cognitive studies. We would rather see the two poles as a continuum from research, reflection and knowledge to action and projection with performativity studies position in the intersection of the 'cognitive' and 'normative' cluster (see Figure 1).

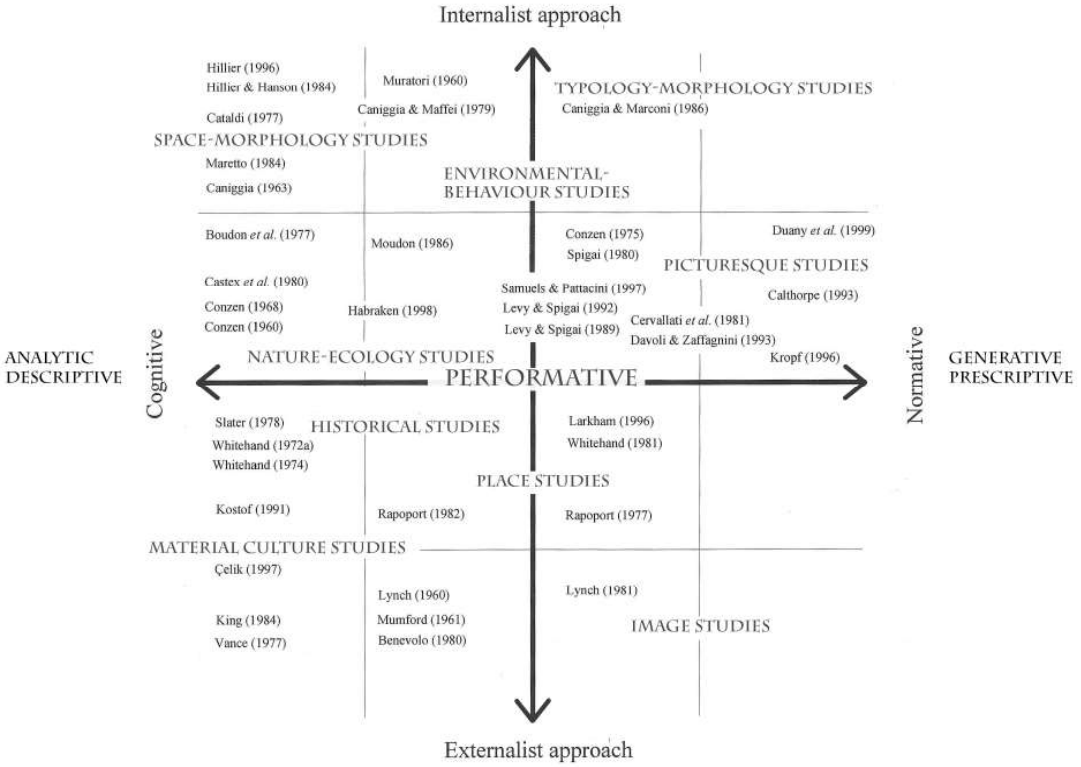
A review of scientific publications addressing urban form's role in environmental performativity, for instance, shows not only an increasing interest since 2000 (Colding et al., in progress), but also shows that the descriptions and measurements of urban form used in these studies are highly inconsistent, lacking shared theoretical frameworks and terminologies. This, quoting Whitehand (2012, p. 60), disables the results "to be connected so as to form the basis for a wider, integrated body of knowledge". Further, a fine-grained understanding of urban form, what can be called 'the cognitive level of urban space', that is, the level where 'people in the street' experience the city, is underdeveloped and results are therefore deemed unsatisfactory for theoretical advancement of the field of urban design (Batty, 2008). Urban geographers (Talen, 2003), spatial analysts (Kwan et al., 2003) and urban morphologists (Hillier, 1996), independently point out the lack of knowledge on this scale of urban space.

Space-morphology is one of nine 'areas of concentration' within urban morphology recognized and described by Moudon in her paper 'A catholic approach to organizing what urban designers should know' (Moudon, 1992) as the analytical approach within urban design research. Kropf (2009) categorized urban morphology research and identified four different approaches that have emerged within urban morphology: spatial analytical, configurational (or space syntax), process typological and historico-geographical. The first two cover what Moudon (1992) described under the heading space-morphology as the latter two represent the Italian respectively the English and French school (Moudon, 1997).

The focus of space-morphology is to "uncover the fundamental characteristics of urban geometries" (Moudon, 1992, p. 343). As such, it comes close to what is called *mathematical morphology* in geostatistics (Silin et al., 2003) and clearly fits the earlier described cognitive-descriptive cluster of Gauthier and Gilliland (2006) as shown in Figure 1. We will present two examples of research that pick up this thread which, Moudon argues, built on the seminal work of Martin and March presented in 'the grid as generator' (Martin and March ,1972) and connect this to what is known as 'space syntax' research. Together these represent the core of the two research directions within space-morphology identified by Moudon (1992). One might want to add a third direction as Kropf (2009) suggests to also include the work of Michael Batty and the Centre for Advanced Spatial Analysis (CASA) focusing on modelling and simulation. However, we see this direction more as a branch in the tradition of 'spatial modelling' (e.g. Wilson 2000), with its origin in the models of von Thünen (1826) and Christaller's Central Place Theory (1933) than as a part of 'urban morphology'.

With this paper we want to foreground space-morphology and with two examples we hope to show how this approach can contribute to more performative studies within urban morphology and adjacent fields using more advanced and life-like representations of urban form and through that contribute to the theoretical advancement of the field of urban design. Below follows, firstly, a more general description of the two directions within

Figure 1. An overview of the categorization of urban morphology research, based on Gauthier and Gilliland (2006, p. 46) and Moudon (1992)



space-morphology to, secondly, present the two studies integrating both directions and thirdly, some concluding words on how this can contribute to the theoretical advancement of the field of urban design.

Space-morphology: towards an integrated analytic approach in 'urban morphology' using mathematics

The first direction within space-morphology was formalized when Leslie Martin and Lionel March founded the Centre for Land Use and Built Form Studies at Cambridge University after WWII, but the approach can be dated back as far as 1867 when the Catalan engineer Ildefonso Cerda published his opus, the *Teoria de la urbanizacion.* Also the work of CIAM (*Congrès Internationaux d'Architecture Moderne*), founded in 1928 at the initiative of Le Corbusier and Siegfried Gideon in La Sarraz, Switzerland, Raymond Unwin, member of the *Garden City Movement* in England and Anton Hoenig in Germany in the early twentieth century are exponents of this approach.

They all used mathematical reasoning to either measure 'urban quality' as Hoenig (1928) proposed with his concept of spaciousness (*Weitraumigkeit*) or to show that it was cheaper to build in low densities as Unwin (1912) did in his pamphlet 'Nothing gained by Overcrowding' (Berghauser Pont and Haupt, 2010). In the book 'Urban Space and Structure', Martin and March (1972) argued, amongst many other things, that more floor space could be realized in semi-detached housing types in the countryside than with high-rise buildings in inner-city centres. The reasoning is that as the city expands with equal-width bands, the outer bands are able to accommodate more built space than the inner bands. Le Corbusier, on the other hand, showed with similar mathematical reasoning that a model for a *Green City* which combines plenty of open space, light, sun and fresh air with land use efficiency and minimal distances travelled, only can be real-

ised with high-rise buildings. A more recent, and less normative, development in this field is the 'Spacemate' model developed by Berghauser Pont and Haupt (2010).

The Spacemate model relates together four geometrical properties to segregate building types numerically: density expressed as floor space index (FSI), ground coverage or ground space index (GSI), spaciousness expressed as open space ratio (OSR) and number of storeys (L). Steadman (2013) provided further theoretical explanation for Berghauser Pont and Haupt's empirical findings by linking these to the work of Martin and March.

The focus of these planners, architects and researchers is to uncover the fundamental characteristics of urban geometries by quantifying the spatial elements and their relationships. In other words, they are interested in uncovering the *logic of space*.

The other direction within space-morphology is based on the work of Bill Hillier and Julian Hanson and their group at the Bartlett, also known as the 'space syntax group'. They extended this search for the logic of space to the *social* logic of space (Hillier and Hanson, 1984) as their aim was to "enrich the description of built form in ways that express aspects of performance and function" (Peponis, 2014).

Of fundamental importance for this research direction is the development of the 'axial map', which is a map constructed from the point of view of a cognitive subject, i.e. an experiencing and acting human being. The axial map is made up of the least amount of straight lines that cover all accessible open space in the area of analysis, where each straight line (here called 'axial line') in the map represents an urban space that is possible to visually overlook and physically access. Thus, the axial map constitutes a network, defined on the cognitive scale, of all accessible spaces in the urban area it represents, in which different properties of this network are possible to measure. The reason for the success of the axial map in capturing for instance pedestrian movement is likely to be its ability to geometrically capture both the energy effort and the informational effort for a moving subject in an urban area, or as Hillier (2003) argued: If we make a straight line crooked "we do not add significantly to the energy effort required to move along it, but we do add greatly to the informational effort required" (ibid., p. 3).

Even though the two directions show similarities in their analytic approach using mathematics to unravel patterns and relationships between spatial elements, there are also substantial differences of which the following three are the most fundamental. The approach represented by Martin and March rather examines the individual components of urban form and how these relate to one another, such as streets, plots and buildings, while space syntax stresses the relative or systemic dimension of such components. Another difference is that Martin and March defined urban elements from a conceived rather than perceived point of view. For instance, the urban block, which typically is easy to identify on a map, actually is very difficult to perceive in urban space. The morphological descriptions developed within space syntax on the other hand typically have their *rationale* from the point of view of human perception and cognition. We here find a vital characteristic to space syntax, namely its strong link to cognition science, but especially the ecological approach to human perception developed by James Gibson (1979). Thirdly, Martin and March's approach focuses on urban form and its internal logic as space syntax typically is interested in the effects of urban form on social processes.

The 'systems approach' and the particular distance measure related to human perception and cognition developed in space syntax is likely to be the reason for the consistent correlations between space syntax measures and pedestrian movement (Hillier and Iida 2005). However, it is also shown that in both rapidly growing cities as in highly planned neighbourhoods, variations in movement cannot be explained by this type of analysis alone (Netto et al., 2012; Ståhle, 2008; Ratti, 2004). We see therefore great potential in integrating these two directions *within* space-morphology where the syntactic approach, typical for space syntax is better in capturing the systemic properties of a place and Martin and March's approach is better in developing a typology of places and where space syntax is good at quantifying differences within areas of the same type, but the other approach is better at classifying and quantifying differences *between* areas (Berghauser Pont and Marcus, 2015). To so to speak 'load' the axial map with other attributes such as population density has been important in the development of a separate branch within space

syntax that has been most prominent in the research group SAD in Stockholm where they even developed a software to do just that: the Place Syntax Tool (Ståhle 2008)

We will use two recently published papers to show the potential of an integrated approach within space-morphology. The first presents a method to measure density in such a way that it represents building types for so called 'walkable regions', or, expressed differently, for areas one can reach on foot in let's say 10 minutes when leaving your home or work address. The second presents a method to measure pedestrian movement through measures of density and distance both in terms of their syntactic values and the morphological types they represent. Further, we will use these methods to map the spatial patterns in Stockholm to show how density, different building types and centrality are distributed and in turn show a probable distribution of pedestrian flows. We use the statistical method of two-step-clustering available in the software package SPSS[1]. The principle of this clustering technique is that it in a first step pre-clusters the data using a sequential clustering approach based on the distance criterion. In the second step these sub-clusters are input to define the desired number of clusters to map the density and movement patterns in Stockholm. Since the number of sub-clusters is much less than the number of original records, traditional clustering methods can be used, in this case the agglomerative hierarchical clustering method.

Case 1: mapping density patterns

Berghauser Pont and Haupt (2010) developed a classification system to distinguish different types of buildings and neighbourhoods based on the distribution of density. They have shown that only by expressing urban density through a composite of variables, Floor Space Index (FSI), Ground Space Index (GSI), Open Space Ratio (OSR) and building height (L), can various morphological types be distinguished numerically[2]. Each spatial solution, high and spacious or low and compact, results in a unique combination of the density variables and a unique position in the Spacemate diagram they developed. FSI on the y-axis gives an indication of the built intensity in an area and GSI on the x-axis reflects the ground coverage, or compactness, of the development. The OSR and L are gradients that fan out over the diagram (see Figure 2). Earlier research by Berghauser Pont and Haupt (ibid.) shows that morphological types cluster in different positions in the Spacemate diagram. The examples within the cluster marked with *G* in Figure 2 have, for instance, both a high FSI and GSI and mostly contain mid-rise buildings of three to seven storeys enclosing a yard, the 'court type' according to Marin and March (1972). Examples with both a low FSI and GSI (cluster marked *A*) consist of low-rise detached houses with large gardens (the 'pavilion type'). Examples in between these two can be described as more linear developments (the 'street type') such as row houses up to three storeys (cluster *B*), slabs of three to seven storeys (cluster *E*) or slabs higher than seven storeys (cluster *H*). Steadman (2013) recently published a paper showing how the clustering Berghauser Pont and Haupt found empirically with samples from the Netherlands, Germany and Spain, also holds on a theoretical level referring back to the work of Martin and March, discussed earlier.

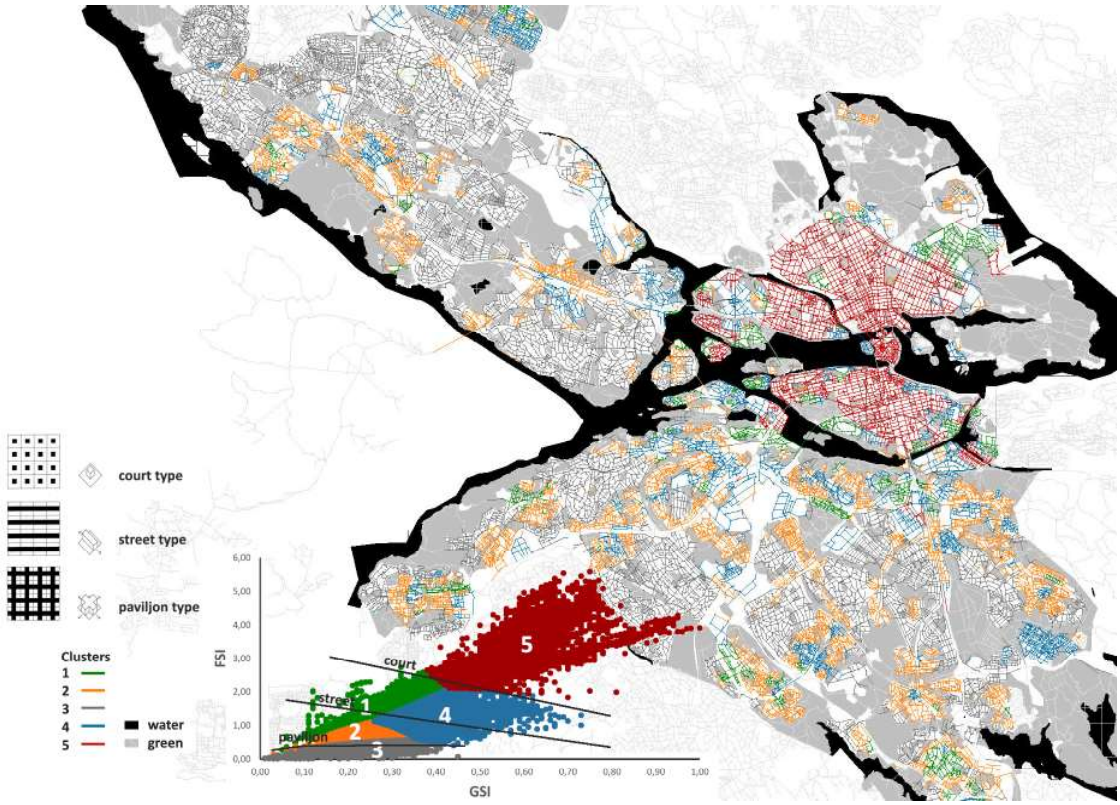
Berghauser Pont and Marcus (2014) have found indications that by adding the accessibility measures to the density equation, directly borrowed from the other direction within space-morphology, and using the axial line to measure distance, one is able to include the cognitive experience of a person moving through urban space and the associated experience of varia¬tions in density and building type. This is a promising example of how the integration of the two directions within space-morphology enable us to map what can be called *perceived* density.

Figure 2 shows the density clusters that resulted from the clustering analysis in Stockholm using the two-step-clustering in SPSS both on the map as well as projected in the

[1]SPSS (Statistical Package for the Social Sciences) is a software package used for statistical analysis. The original SPSS manual was published in 1970 by Bie, Bent and Hull.

[2]For definitions of these density variables, see Berghauser Pont and Haupt (2010), p. 107-114.

Figure 2. Density patterns based on the cluster analysis in SPSS using accessible FSI, accessible GSI and L as input variables and the same clusters projected in the Spacemate model. The clusters capture besides variations in the density variables also variations in building types such as the court, street and pavilion type. (see for a more extensive discussion Berghauser Pont and Marcus, 2014; Steadman, 2013; Berghauser Pont and Haupt, 2010)

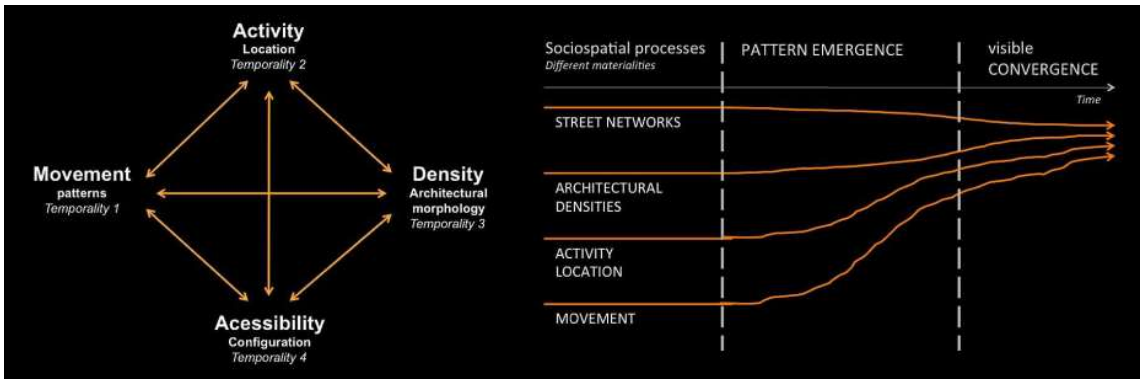


Spacemate diagram. The input variables for the clustering were the density variables accessible FSI, accessible GSI and L as described in Berghauser Pont and Marcus (2014). The map shows five clusters with significant combinations of FSI, GSI, OSR and L. The cluster 2 and 5, for instance, have similar building heights, but represent distinct building types: cluster 5 is of the 'court type' with a relative high GSI and FSI and cluster 2 is of the 'street type' with a relative low GSI and FSI. In other words, it is the combination of variables that enables us to distinguish building types. Moreover, the clusters on the map represent areas that one perceives as being of similar character when walking through your local neighbourhood, measured from each address point independently. This results in a density that reflects not only the density of an address, a plot or an administrative neighbourhood, but it captures the density within the walkable 'region' defined with a fixed distance threshold, in this case 3 turns (i.e. axial steps) with a maximum length of 500 meters[3]. In other words, these regions are defined from a perceived rather than a conceived point of view making the results more relevant from the point of view of a person experiencing the area. This also explains why some clusters on the map are larger in size than others and changes in density are smoother. If you live in a villa, the density experience is different for a person living in a villa neighbouring an apartment building from a person living in a villa that is surrounded by other villa's.

Most importantly, this sets a new principal frame that opens up for a series of other patterns representing density for other distances such as perceived density for walking

[3]This distance proved to best capture what was defined as 'urban fabric' in Berghauser Pont and Haupt's (2010) original work.

Figure 3. Relations of urban patterns of different materialities, roles and temporalities (left) and a hypothesis of convergence of these patterns (right): interrelations and mutual dependences would lead to progressive convergence in time following the theory of natural movement of Hillier. (Netto et al. 2012, p. 8167:4-5)



versus perceived density when biking. In extension, there is the possibility to also construct analyses based on the perception and cognition of other species than humans. This could prove highly interesting for the analysis of urban ecosystem services. A test in this direction has been conducted for bumblebees and the ecosystem service pollination in highly urbanised areas (Marcus, Berghauser Pont, Gren 2014).

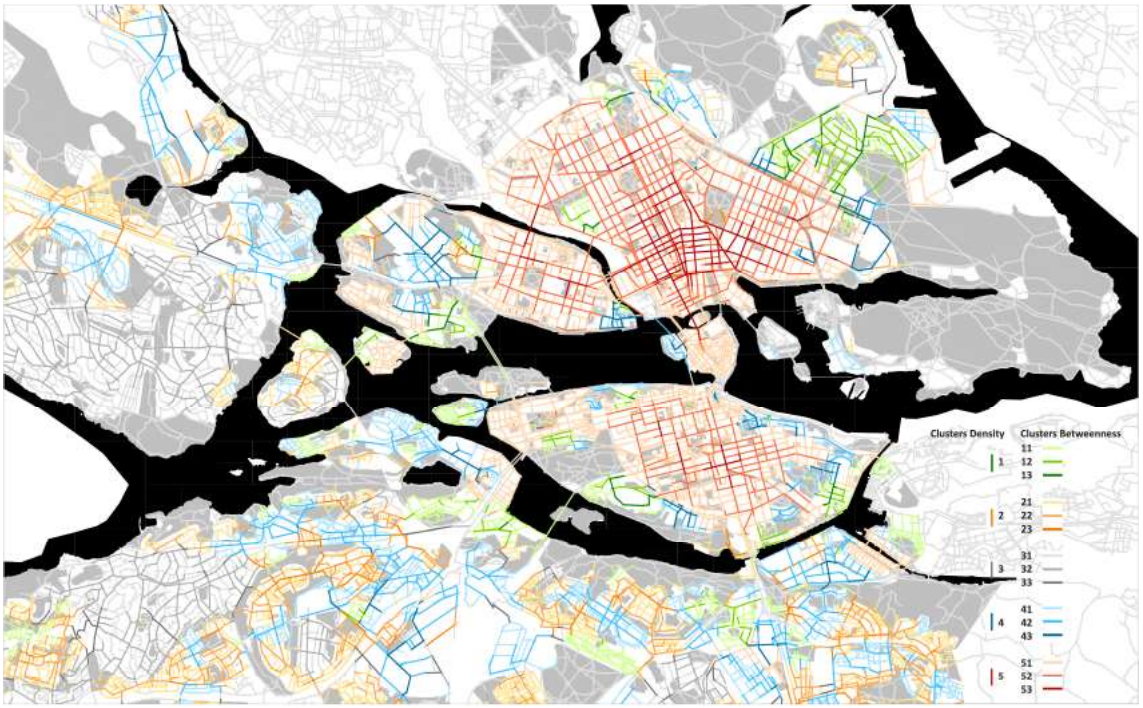
Besides the possibility of measuring what could be called walkable or bikable density, or density perceived from any other travel mode, this approach is also highly interesting for a comprehensive problem inherent to all measures of urban density and many other geographic descriptions: the modifiable areal unit problem (MAUP). In short, it concerns the problem of the delimitation of spatial units and how this impacts the result of the analysis. Larkham and Morton (2011) have discussed this issue extensively, but what is of interest here is that the introduction of the distance measure in the delimitation process includes the user's perspective and defines the boundaries via the position of a location in the city and what is possible to 'reach' from there at different radii, why the boundary problem in the traditional sense disappears (see for a more extensive discussion Berghauser Pont and Marcus, 2014).

Case 2: mapping movement patterns

A long series of space syntax studies around the world have found strong correlations between integration and pedestrian movement that is, one can say, the most generic aspect of urban space use (Hillier and Iida 2005). Moreover, a large body of research (e.g. Greene et al. 2012, Koch et al. 2009) has found correlations between urban form and other urban phenomena, where movement works as the intermediary such as crime and social segregation. However, the predictive power varies depending on the type of neighbourhood as several scholars have pointed out (e.g. Netto et al., 2012; Ståhle, 2008; Ratti, 2004). Ratti (ibid.) questions whether what Hillier calls "the hidden role of geometry in cities" (Hillier, 1999, p.182) applies to all cities and if not, which are the conditions under which space syntax analysis can be used?

The explanation for the different patterns of movement in planned, naturally grown and rapidly growing cities is, according to Netto et al. (2012), that dissonances between patterns of accessibility, density, and activity are at work impacting the patterns of movement (see Figure 3). The process of alignment, that is, the tendency of certain states in one pattern to match specific states in other patterns, is by Hillier reduced to the 'multiplier effects' of the street network. Netto et al. (ibid.) describe a more dynamic and complex dependence between these patterns where convergence and dissonance interplay in time. Berghauser

Figure 4. Movement patterns based on the cluster analysis in SPSS using attraction betweenness as extra input variable within each density cluster as was shown in Figure 2



Pont and Marcus (2015) have shown that the way a neighbourhood is planned impacts the process of alignment between patterns. Where shopping centres or public transport nodes, for instance, are located in dissonance with the street network and changes over time are costly and often restricted through zoning laws, the process of convergence is disturbed. We can imagine that in such cases, the movement pattern follows activity locations such as local centres or subway stations more than that it follows the street pattern.

To verify this, three areas in Stockholm were studied: City/Norrmalm, Södermalm and Högdalen, representing both a variety of street morphologies and density types but also following different planning paradigms. A description of the areas can be found in the paper 'What can typology explain that configuration can not?' presented at the 10th space syntax symposium in London (Berghauser Pont and Marcus, 2015).

For two central measures within space syntax, Berghauser Pont and Marcus (ibid.) found that betweenness centrality is a more robust measure than closeness centrality[4] in predicting pedestrian movement in areas of different morphological character. The closeness measure calculates the least mean distance cost from each line segment (or axial line) to all others in a system (Hillier and Hanson, 1984). This measure thus shows, for each and every line, how many steps (measured topologically) you are away from all other lines. The betweenness measure shows how often a line segment is part of the shortest path between all pairs of segments in a system. In other words, line segments that are needed more often when moving through the city have a higher betweenness value than those that are not so often used. Taking such a segment out of the system will affect a lot of routes that cannot be chosen anymore. The lines with a high betweenness can thus be said to be more important for the functioning of the system. A striking difference between these two measures can be observed on maps where closeness ranges tend to cluster while betweenness ranges are scattered over the urban system. Further, Berghauser Pont and Marcus (2015) show that the most effective radius for the analy-

[4]Referred to as 'choice' and 'integration' in many space syntax studies, but in network modelling, referred to as 'closeness centrality' and 'betweenness centrality' respectively (Hillier and Iida, 2005).

sis varies between different neighbourhood types, which indicates that neighbourhoods seem to 'operate' at different scales. Further, the walking behaviour in neighbourhoods that are highly planned are more sensitive to the distribution of density and attractions than more grid-like neighbourhoods.

Despite these differences, they also show that a good first indication of pedestrian movement patterns can be captured with two relative simple measures. The relative pedestrian *intensity* can be predicted using the accessible density (FSI) measure and the *distribution* of pedestrians can be forecasted with the attraction betweenness measure at a radius of 1 km. These two rather simple measures of density and distance can explain 40% of pedestrian movement (ibid.). To map the pattern of movement in Stockholm we used these results in the two-step-clustering described earlier. The input variables are the same as those used for the density clustering, but now the attraction betweenness measure is added to the analysis which is shown to be important for the distribution of pedestrians in each density cluster.

Figure 4 shows the variations in attraction betweenness within each density cluster for Stockholm as a whole and for the three neighbourhoods City/Norrmalm, Södermalm and Högdalen separately. As described earlier, this variance in density and distance explains the distribution of pedestrians between and within each area. It should be repeated, however, that this only shows a prediction of pedestrian movement based on observations in three neighbourhoods in Stockholm where these measures explained 'only' 40% of the distribution of pedestrian flows. The addition of other measures such as closeness centrality, accessible floor space and distance to local centres increases the predictive power of the model (see for a more extensive discussion Berghauser Pont and Marcus, 2015.

Discussion: Two research communities joining forces

With this paper we wanted to foreground *space-morphology* and with two examples show how this approach can contribute to the theoretical advancement of the field of urban design. A better understanding of 'how the built environment works' and 'how built environments significantly differ' can be arrived at by developing such multi-dimensional descriptions of urban form combining the two directions within space-morphology. The combined approach presented here takes us a step (and only one step) towards understanding the performativity of urban form. The urban form data with both a high spatial resolution and a strong link to cognitive science can further be used in other fields to increase the relevance of their findings for the field of urban design where interventions take place at the architectural scale and not at the more abstract geographical scale.

If you like, this paper can be interpreted as an argument to join forces between the two research communities 'urban morphology' and 'space syntax' which both have organised conferences for around 20 years now. It might be time for a joined conference where both parts present the possibilities of an integrated approach to increase our understanding of cities and so contribute to the unprecedented expectations on cities, which increasingly, are seen as the means to the solution of problems such as climate change, social segregation and loss of biodiversity, rather than the root of the problem. This creates knowledge demands that we are currently not prepared for, but where space-morphology can play an important role providing more advanced measures of urban form, integrated analytic methods including both the understanding of the separate parts, the relations between the parts and their role in the system as a whole.

References

Batty, M. (2008) 'The Size, Scale, and Shape of Cities', *Science*, 319 (5864), 769 – 771.
Berghauser Pont, M. and Haupt, P., 2010. *Spacematrix. Space, density and urban form* (NAi Publishers, Rotterdam).
Berghauser Pont, M. and Marcus, L. (2014), 'Innovations in measuring density: from area density and location density to accessible and perceived density'. *Nordic Journal of Architectural Research,* 2, 11-31.

Berghauser Pont, M. and Marcus, L. (2015) 'What Can Typology Explain That Configuration Can Not?' *Proceedings of the 10th International Space Syntax Symposium* (forthcoming).
Gauthier, P. and Gilliland, J. (2006) 'Mapping urban morphology: a classification scheme for interpreting contributions to the study of urban form', *Urban Morphology*, 10(1).
Greene, M, Reyes, J, Castro, A. (2012), *Proceedings of the 7th International Space Syntax Symposium* (Pontefica Universidad Catholica de Chile).
Hillier, B. & Hanson, J., 1984, *Social Logic of Space*, Cambridge University Press.
Hillier, B., 1996, *Space is the Machine*, Cambridge University Press.
Hillier, B. (2003) 'The Architectures of seeing and going: Or, are Cities Shaped by Bodies or Minds? And is there a Syntax of Spatial Cogni¬tion?' *Proceedings of the 4th International Symposium in Space Syntax*, UCL London, 06:1-34.
Hillier, B. and Iida, S. (2005), 'Network and psychological effects in urban movement'. *Proceedings of the Fifth International Space Syntax Symposium*, Delft: University of Technology.
Koch D, Marcus L, Steen J, 2009, *Proceedings of the 7th International Space Syntax Symposium* (Trita-Ark KTH).
Kropf, K. (2009) 'Aspects of urban form', *Urban Morphology*, 13(2), 105-120.
Kwan, M-P. and Weber, J. (2003) 'Individual accessibility revisited: implications for geographical analysis in the twenty-first century', *Geographical Analysis*, 35, 341-353.
Larkham, P.J. and Morton, N. (2011) 'Drawing lines on maps: morphological regions and planning practices', *Urban Morphology,* 15(2).
Marcus, L., Berghauser Pont, M., Gren, Å. (2014) "Can spatial form support urban ecosystem services: Developing descriptions and measures to capture the spatial demands for pollination using the framework of space syntax", *ITU A/Z,* 11:2, 255-270.
Marshall, S. (2012) 'Science, pseudo-science and urban design' *Urban Design International,* 17, 257-271.
Martin, L. and March, L. (1972), *Urban space and structures* (Cambridge: Cambridge University Press).
Moudon, A.V. (1992) 'Getting to Know the Built Landscape: Typomorphology', in K. Franck and L. Schneekloth (ed.) *Ordering Space: Types in Architecture and Design* (Van Nostrand Reinhold, New York) 289-311.
Moudon, A. (1997), 'Urban morphology as an emerging interdisciplinary field' *Urban morphology*, 1, 3-10.
Netto, V., Sabayo, R., Vargas, J., Figueiredo, L., Freitas, C. and Pinheiro. M. (2012), 'The convergence of patterns in the city: (Isolating) the effects of architectural morphology on movement and activity'. *Proceedings of the eighth International Space Syntax Symposium* (Santiago de Chile: PUC).
Peponis, J. (2014) 'Investigative Modeling and Spatial Analysis: A commentary of directions', Paper presented at the Research Workshop at KTH, part of the project RIBS, FP7/2007-2013.
Ratti, C. (2004), 'Urban texture and space syntax: some inconsistencies'. *Environment and planning B*, 31, 487-499.
Steadman, P. (2013) 'Density and built form: integrating «Spacemate» with the work of Martin and March' *Environment and Planning B: Planning and Design* 40, 341 - 358.
Ståhle, A. (2008) *Compact Sprawl: Exploring Public Open Space and Contradictions in Urban Density* (Stockholm: KTH dissertation).
Talen, E. (2003) 'Neighborhoods as service providers: a methodology for evaluating pedestrian access' *Environment and Planning B* 30 (2), 181-200.
Whitehand, J. (2012) 'Issues in urban morphology', *Urban Morphology*, 16(1), 55-65.

Identified and modelled elements of urban fabric in academic works of students

Dalia Dijokiene
Department of Urban Design, Faculty of Architecture, Vilnius Gediminas Technical University, Vilnius, Lithuania
Keywords: urban fabric, urban form, academic work

Abstract

Every town has a unique urban structure regardless of whether it has developed spontaneously or in a planned way. The entirety of structural elements (streets, squares, blocks, buildings, etc.) forms a tri-dimensional composition of the town – its spatial structure. Some researchers of the urban phenomenon emphasize importance of certain elements in the formation of townscape, while other researchers accentuate other elements. Some consider the street to be the key element organising urban space, while others refer to the block (or a set of land plots) as the key instrument shaping streets and squares. Still another school of thought view the built-up as the determinant of towns' panoramas and silhouettes. All these considerations are valid. However, in order to understand the entirety and to analyse uniqueness of each urban object it is necessary to analyse distinctive features of the plan, built-up, size-and-space composition. This research analyses what elements of urban fabric students of architecture recognise/identify and model/design in their academic works. The presentation looks into and summarizes the knowledge accumulated from the academic works of students of Faculty of Architecture, Vilnius Gediminas Technical University (FA, VGTU) carried out in 2010 – 2014. It reviews methodology, tasks, solution argumentation and methods of designing new urban quality in historically developed urban fabric.

Introduction

Town is a complex physical organism with a social content. It is situated in a concrete natural environment and is governed by time. Urban structure is a phenomenal subject of research. There is no, and probably cannot be, one single way of analysing such a complex formation. Multifaceted nature of urban structures has led to the establishment of a variety of methods of urban structure analysis. Architects and academics of architecture not only have developed a wide range of theories of town perception and methodologies of urban structure analysis, they have also differently perceived significance of elements forming those structures. Urban fabric can be studied by looking first of all into its historical development. According to Alexander R. Cuthbert, classic urban form history books can be organised into five basic categories: (1) chronologies (authors: Mumford, Spieregen, Gutkind, etc.); (2) typologies (authors: Kostoff, Moholy-Nagy, Hall, Krier); (3) utopias (authors: Eaton, Tafuri, Doxiadis, Roseneau); (4) fragments (authors: Boyer, Hall, Koetter and Rowe, Kostoff); (5) materialist theory (authors: Korn, Tafuri, Frampton, Boyer, Knesl, Dickens) (Cuthbert 2006: 27). Designing urban fabric, we have to look at the town/city not only as a time-series, but also as a form-series. That is why the author of this article has aligned herself more with the authors analysing typology of urban fabric. Various authors categorise urban fabric on the basis of various elements. The classic examples of identified composite elements of urban form are the city edge, urban divisions, public places, streets, the urban process (Kostoff 1992) or path, edge, district, node, landmark (Lynch 1960).

Every town has a unique urban structure regardless of whether it has developed spontaneously or in a planned way. The entirety of structural elements (streets, squares, blocks, buildings, etc.) forms a 3-dimensional composition of the town – its spatial structure. Some researchers of the urban phenomenon emphasize importance of certain elements in the formation of townscape, while other researchers accentuate other elements. Some consider the street to be the key element organising urban space, while others refer to the block (or a set of land plots) as the key instrument shaping streets and squares. Still another school of thought view the built-up as the determinant of urban panoramas and silhouettes. All these considerations are valid. However, in order to understand the entirety and to analyse uniqueness of each urban object it is necessary to analyse distinctive features of the plan, built-up, volumetric-spatial composition.

In her research the author looks into what elements of urban fabric students of architecture recognise/identify and model/design in their academic works. This presentation analyses and summarizes the knowledge accumulated from the academic works of students of the Faculty of Architecture, Vilnius Gediminas Technical University (FA, VGTU), carried out in 2010-2015. It reviews methodology, tasks, solution argumentation and methods of designing new urban quality in historically developed urban fabric.

Methodology

Traditions and urban design approach at the Department of Urban Design (VGTU)

At the 1981 Congress, the International Union of Architects (UIA) defined a very broad concept of architectural activity describing architecture as an art and science of designing the surroundings. The scope of designing was said to include spaces of any size and purpose and to range from designing a room to a building, or a town spaces and districts (UIA 2013). At major European technical universities or higher schools of architecture urban design (urban design and planning, urbanism) is normally taught at faculties (or departments) of architecture as part of the architectural studies programme. The Department of Urban Design of VGTU represents scientific and academic positions of urban design in Lithuania and has traditions of over 70 years (date of establishment is considered to be 1944). The Department, which is part of the Faculty of Architecture, has always applied the European disciplinary concept. Urban design is considered to be a branch of architecture, with urban structure, urban space and its built-up as key objects of research and creative activity. Urban design is an integral part of the art and science of architecture and its indispensable field of activity. It is closely linked to urban planning

and architecture. While urban planning focuses more on systemic urban pattern issues and architecture – on very concrete volumetric tasks, urban design brings those two disciplines together under the concept of urban space (Meuser 2006). The object of urban design is spatial urban structures, for instance, morphotypes of built-up in blocks, public urban spaces (squares and their systems), townscapes, positioning of dominants, etc. Directive 2005/36/EC on the recognition of professional qualifications (Directive 2005/36/EC) sets out the requirements for professional qualifications in the European Union. Requirements applying to the training of architects are defined in Article 46, with its 11 points describing knowledge and skills that a future architect should acquire during the studies. It must be noted that a part of those skills and knowledge may be acquired only during urban design studies, including completion of practical tasks.

Students of the Faculty of Architecture (VGTU) have introduction to urban design as part of their architectural curriculum in their second, third and fourth year, consisting of theory lectures and term project tasks. MA level studies are devoted to cultivating the excellence in the field (see Table 1 below).

Table 1. Urban design tasks and acquired skills

BA level studies	- introduction to urban development and urban design history; - identification of elements of urban pattern; - ability to assess quality of urban structures employing various criteria; - skills of complex designing (coherence with environment, composition of several elements, improvement of an urban structure or composition); - gaining certain knowledge of the principles of regulation of urban design solutions; - other.
MA level studies	- identification of systemic problems of urban pattern; - search for artistic principles of urban pattern formation; - assessment of the impact of urban design solutions on urbanised landscape, townscape; - argumentation of urban design projects from various aspects; - other.

Theoretical methods of urban design

One can agree with Roger Trancik, urban designer and professor, that when analysing practical experience of urban design three approaches to urban-design theory can be identified: (1) figure-ground theory; (2) linkage theory and (3) place theory. The figure-ground theory is founded on the study of the relative land coverage of buildings as solid mass to open voids. Unlike the figure-ground theory, which is based primarily on patterns of solids and voids, the linkage theory is derived from "lines" connecting one element to another. The place theory goes one step beyond these two theories in that it adds the components of human needs and cultural, historical and natural contexts (Trancik 1986: 97). Urban designers aim to create high-quality urban fabric, which depends on factors affecting functionality, aesthetics and durability. Of all the qualities of cities, arguably the one that concerns us most is the nature of the aesthetic experience (Cuthbert 2006: 171). What makes a city beautiful? This is, of course, a vast question. Urban design generally follows established rules of proportions, for example when establishing the dimensions of districts and building lots, streets, squares, and open spaces, in plan as well as in section, or even in defining the proportions of streets or buildings in terms of width, depth, and height. Nonetheless, the use of harmonious proportions in design is not a recipe for success (Schenk 2013: 35). Urban design projects may be created following principles of abstract composition, mathematical calculation, contextuality, rationality, and others.

Figure 1. *Paplauja – historical suburb of Vilnius*

Urban design stages applied at the Department of Urban Design (VGTU)

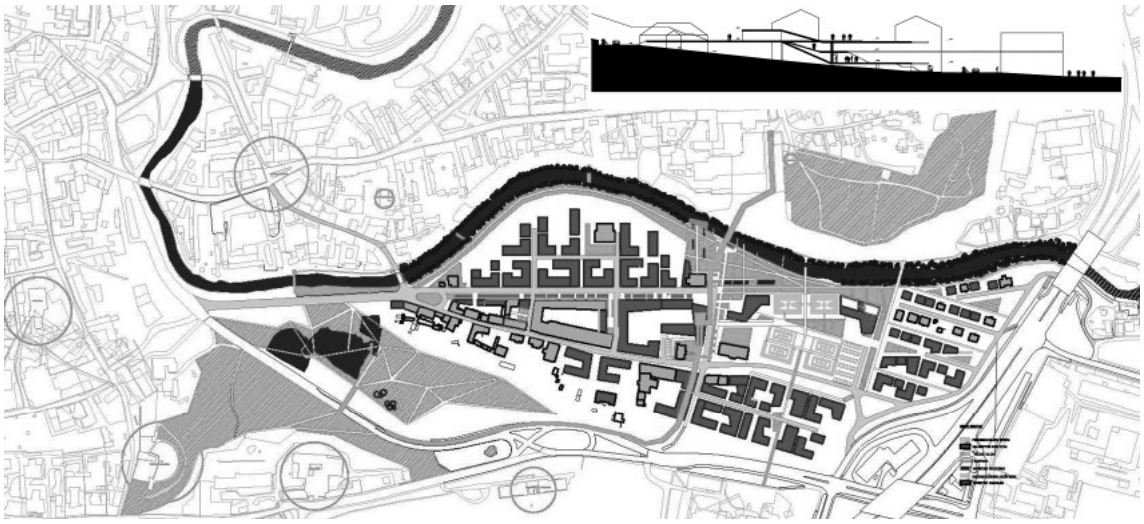
Qualitative expansion and utilisation of inner territorial resources is highly relevant for every single town. Academic works at the Department of Urban Design (VGTU) mostly deal with the task of forming existing towns or their parts. Conversion and revival of the town's historical parts is a subject that interests not only professional architects and urban designers but also students of architecture. Students often choose derelict territories of the historical part of a town, converted industrial zones or "wilderness" of large-scale construction of residential areas for their term and graduation projects. Creating a new urban quality in historical environment without prejudice to the existing harmony is a complex and challenging task. Solution must be sought with methodological consistency. In order to achieve good results, the following design stages are in place: study of features of existing urban structure (analytical part), determination of urban-architectural concept underlying territorial formation (conceptual part), detailed design (project part).

Analytical part. Students start their work by carrying out a detailed and multifaceted analysis of the territory of their choice. They study the historical and urban development of the area and identify valuable elements of plan and built-up preserved there. Structural elements that existed in the past are indicated in the plan of the current urban structure. This helps to understand how mature the structure in question is – has its development been smooth or with deformations. As next, students conduct urban analysis of the territory's current condition. The following elements are assessed and analysed: the territory's position vis-à-vis the whole town; the network of streets and transport scheme; the natural conditions (landscape, water pools, greenery); predominant built-up morphotypes; elements of the composition of size and space, expressiveness and singleness; architectural quality of the buildings; system of the land plots; visual links between vertical landmarks and public urban spaces; the quality of public and private urban spaces (courts, streets, squares, etc.). This analysis is aimed at assessing the quality of the urban structure in question. The analytical part is summarised in a final plan and supplementing schemes and the author defines criteria on which he/she bases the concept of a new urban quality in the regenerating territory.

Conceptual part. After studying urban and architectural heritage, students propose several conceptual solutions for regenerating the blocks. Solutions are presented by means of schemes, plans and a 3-dimentional model. A best reasoned solution is then selected.

Project part. This stage involves drawing of a detailed plan of the volumetric-spatial structure of the selected conceptual solution: the territory's public urban spaces (e.g. squares) and buildings shaping them are presented in detail. In order to make a regenerating block "lively", the plan must include both public and residential buildings (Dijokiene 2013).

Figure 2. Urban architectural concept of conversion of industrial territory in Paplauja (student E. Archipovaite, tutor D. Dijokiene, 2007)



Forming process

Principles of urban concept formation

The urban structure of a town has always changed, is still changing, and will be changing in the future – change is the engine of its existence. Each generation makes an effort to preserve in the town what it considers valuable and changes what seems to need a change. Whether or not architects take into account the existing urban structure depends on the social aspect of the order that they work on as well as on the mentality of the architects (Vysniunas 2002). If the new urban concept is created ignoring the established structure, in most cases it leads to a conflict and may fail in the end. According to K. Lynch, there is an optimal limit for the signs of the past to stay in existence. If the amount of these signs becomes too small, there is a risk of losing orientation. Such radical changes indicate that the "historical clock of the urban structure" gets set going once again (Lynch 1960). If the history of urban development of an urban structure is sufficiently rich and the structure contains many valuable historical elements, a student faces a task of "decoding" the compositional framework of the structure and supplementing or extending its formation process pursuant to the existing tradition. If the territory has undergone too many structural changes or if its compositional framework has never been valuable, the task is to define a new concept for the formation of the territory's urban fabric. In their projects students apply various theoretical methods of urban design described earlier in this article.

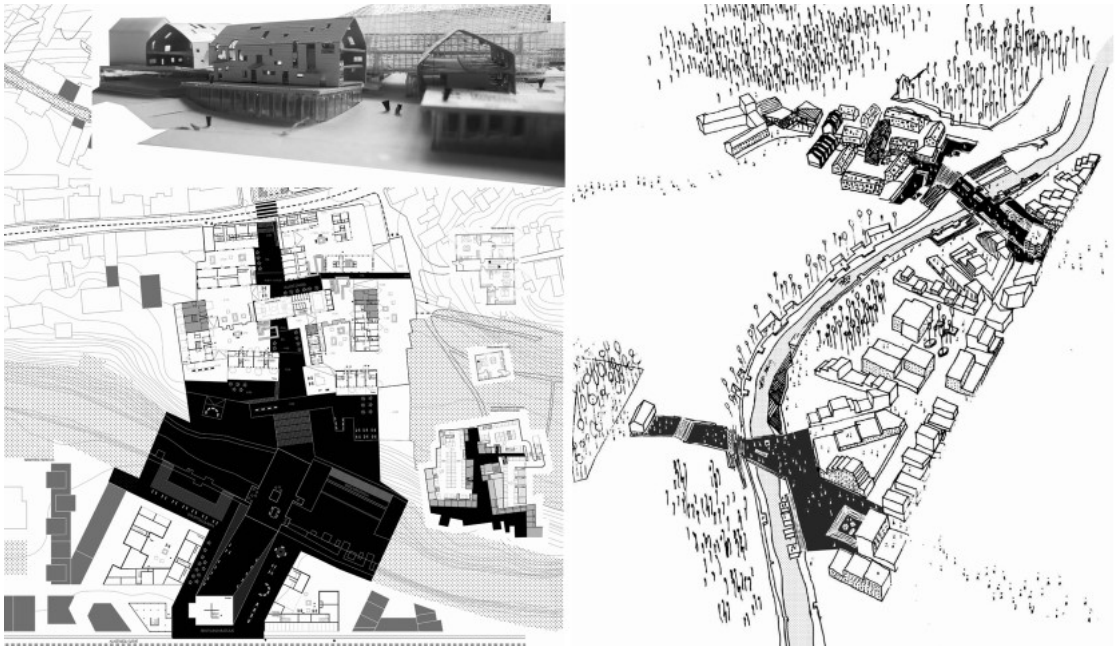
New urban quality in existing environment is designed by means of *plan formation, built-up* and *volumetric-spatial composition* (Dijokiene 2012). Analysis of students' projects reveals the following *principles of plan formation* in designing urban territories:

- routes of former streets are sought and attempts to regenerate them are made;
- new links between objects of attraction – cultural heritage objects, public buildings and spaces, etc. – are sought and established;
- urban public spaces are regenerated and new ones are formed;
- landscape and water are employed for achieving new quality of urban public spaces;
- size of blocks is established based on examples from historical environment.

Future architects and urban designers planning new built-up in existing environment are guided by the following principles:

- preservation of old buildings and their adaptation for new functions;
- development of new built-up following the principles of traditional architecture;

Figure 3. Urban architectural concept of conversion of industrial territory in Paplauja (student N. Tukaj, tutor D. Dijokiene, 2011)



- search for new architectural forms.

In their attempts to preserve, supplement or create new volumetric-spatial composition of urban fabric students apply the following methods:

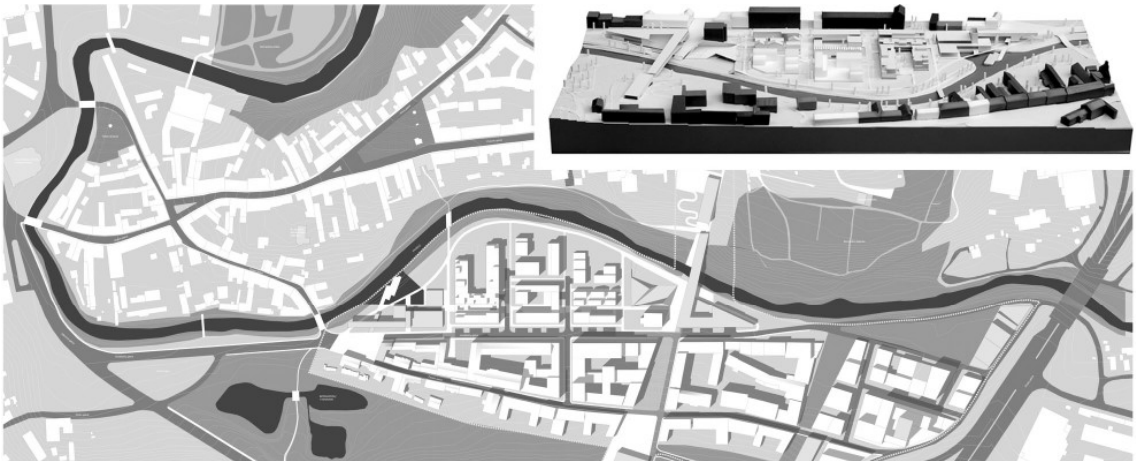
- built-up is formed taking into account human scale and the scale of the existing built-up;
- built-up is adjusted to emphatic landscape;
- in the formation of built-up attention is paid to visual links to existing valuable dominant elements in the territory;
- new dominant elements are created;
- viewing spots are set up in characteristic viewing locations in the territory;
- attempt is made to preserve characteristic panoramas and silhouettes;
- new panoramas and silhouettes identifying the vicinity are created.

Case study

Even if designing of urban objects is governed by a great number of objective principles and the use of both traditional and modern means of form creation, working with the same territory may produce different results. This is because during this process, like in any other creative process, creator's individuality expresses itself. The following section presents a comparison of projects of three students prepared for the same territory.

Vicinity chosen for the project – Paplauja (nowadays called Paupys, meaning "by the river"), a historical territory, formerly a suburb of Vilnius, Lithuania. This was one of the most beautiful and picturesque vicinities of Vilnius. There is no precise data when dwellers moved to this suburb and where it had its boundaries at that time. It is known that since the end of the 14th century there was a settlement on a road leading to the town but it did not grow eastwards because of the narrow terrace of the steep side of the river. The swift and sinuous river Vilnelė caused this suburb to become the capital's first industrial district. By the end of the 18th century, the urban network covered only the western part of Paplauja. In this part of the suburb there were small houses of craftsmen, which served not only as homes but also as workshops. Further there was the land holding of a missionary monastery, with opulent gardens, ponds and kitchen gardens, and the Markučiai estate. In the 18th century, most constructions previously built in Paplauja no longer served

Figure 4. Urban architectural concept of conversion of industrial territory in Paplauja (student G. Gajauskaite, tutor D. Dijokiene, 2014)



their original function and purpose. Remains of the estate and a derelict paper mill still stood in the location of the present-day transport hub. The vicinity plans of the early 19th century do not even mention these buildings. By the end of the 18th century, a new channel was excavated and a new two-storey brick water mill as well as a house of call with a pub were built in the eastern part of Paplauja. However, all these objects were outside the town's border and this is most likely the reason why the fate of this picturesque suburb later on was not very fortunate. Today the eastern part of Paplauja is probably the most distorted part of the historical landscape of Vilnius. Factories (now derelict), streets, main roads, and the widest bridge across the River Vilnelė were built at the beginning of the 20th century and have irretrievably destroyed the townscape which existed during the 16-19th centuries with water mills, paper mills, estates and other objects (Drema 1991; Katalynas 2006), see Figure 1.

In their analysis of the territory, all the three students note that those urban quarters, which are located so close to the city centre and yet surrounded by nature, should be an important and vibrant part of the city. However, industrial buildings constructed in the Soviet times have affected the local identity and, as a result, the current situation significantly conflicts with the context. In their projects students propose creation of new high-quality urban public spaces and green links integrating them into the overall system of the city's urban spaces, including connections to the neighbouring district and the Old Town. New pedestrian passages are designed and the banks of Vilnelė are customised for recreational use by creating new public spaces. A proposal of new urban fabric is composed, maintaining and articulating the typical perimeter block principle and adapting some of the former industrial buildings for a new use. Architectural expression is created by an attempt to achieve harmonious composition and to create human spatial proportions while preserving important visual connections and maintaining scale typical to the Old Town (Tukaj 2011, Gajauskaite 2014).

In this concrete case the location of the territory in the close vicinity to the Old Town and its exceptional natural settings determine certain urban design solutions. Projects are created following similar principles but what differs is artistic expression transmitted through the modelled elements of the urban fabric (see Figures 2-4).

Conclusion

Architects and academics of architecture have developed a wide range of theories of town perception and methods of urban structure analysis; they have also differently perceived significance of elements forming those structures. Nowadays academic youth have a possibility to get to know various kinds of means of identification of urban fab-

ric elements. Urban design projects may be developed applying principles of abstract composition, mathematical calculation, contextuality, rationality, and others. However, in order to achieve a good result, the following design stages need to be in place: analysis of the features of an existing urban structure (*analytical part*), determination of urban-architectural concept underlying formation of the territory (*conceptual part*), and detailed design (*project part*).

In their academic works students identify elements of plan and built-up forming the volumetric-spatial composition of the urban fabric. When modelling urban fabric elements that have a rich urban development history, the task is to "decode" the compositional framework of the structure and to supplement or extend its formation process pursuant to the existing tradition. If the territory has undergone too many structural changes or if its compositional framework has never been valuable, a new concept for the formation of the territory's urban fabric is sought.

Students of the Faculty of Architecture of VGTU follow three theories of urban design when designing urban objects: (1) figure-ground theory; (2) linkage theory, and (3) place theory. Analysis of academic works of students has revealed that the results of urban design tasks depend not only on the level of theory knowledge but also on the characteristics of elements of the modelled urban object and the designer's individuality.

References

Cuthbert, R. A. (2006) *The form of cities. Political economy and urban design* (Blackwell publishing)

Dijokiene, D. (2012) 'Synthesis of Historical Environment and Modern Society', *Heritage 2012 - Proceedings of the 3rd International Conference on Heritage and Sustainable Development*, vol. 2 (Green Lines Institute, Barcelos) 1113-1122.

Dijokiene, D. (2013) 'Challenges of designing new urban quality in historical environment (based on final projects of BA students of the Department of Urban Design, FA, VGTU)', *Architecture and urban planning* vol. 8 (Riga Technical University, Riga) 60-64.

Directive 2005/36/EC on the recognition of professional qualifications (2005) (http://ec.europa.eu/growth/single-market/services/qualifications/policy-developments/legislation/index_en.htm) accessed 10 May 2015.

Drema, V. (1991) *Dinges Vilnius* [Lost Vilnius] (Vaga, Vilnius).

Gajauskaite, A. (2014) 'Detailed plan of the territory situated between Drujos, Subaciaus, Maironio streets and Vilnele river in Vilnius', in *The best graduation projects of architecture students of Baltic States 2014*. (Architects association of Lithuania, Vilnius) 14-15.

Katalynas, K. (2006) *Vilniaus miesto raida XIV–XVII amžiais* [The development of Vilnius in the 14–17th centuries] (Diemedzio leidykla, Vilnius).

Kostoff, S. (1992) *The city assembled: the elements of urban form throughout history* (Bulfinch Pr).

Lynch, K. (1960) *The image of the city* (MIT Press, Cambridge Massachussettes).

Meuser, P. (2006) 'Experiments with convention. European urban planning from Camillo Sitte to New Urbanism', in Krier, R. *Town spaces* (Birkhauser – Publishers for Architecture) 248-265.

Schenk, L. (2013) *Designing cities. Basics – principles – projects* (Birkhauser, Basel).

Trancik, R. (1986) *Finding Lost Space* (New York, Chichester, Weinheim, Brisbane, Singapore, Toronto: John Wiley & Sons, INC.)

Tukaj, N. (2011) 'Detailed plan of reconstruction of the territory situated between the Vilnele river and Polocko str. in Vilnius', in *The best graduation projects of architecture students* (Architects association of Lithuania, Vilnius) 46-47.

UIA congresses (1981) (http://www.uia-architectes.org/en/s-informer/congres/tous-les-congres#.UjRI_n_zhAo) accessed 20 April 2015.

Vysniunas, A. (2002) *Miesto gyvenamųjų struktūrų rekonstrukcija.* [Reconstruction of Town's Residential Urban Structures] (Technika, Vilnius).

Liegi's urban and aggregative organism lecture

Roberta Ieva, Rossana Natale, Denisio Ranieri, Matteo Ieva
Dipartimento dICAR, Politecnico di Bari, Via Orabona 4, 70125, Bari, Italy
Keywords: Urban organism, Aggregative organism, axes, hierarchical route

Abstract

The research elaborated in final workshop in the city of Liege, established by the department dICAR in the Polytechnic in Bari, re-build the formation different phases of Wallonia's main town. The analysis carried out at a regional scale has allowed us to reconstruct the dynamics formation of Gaul North cities; during the Roman dominion we find a modular structure of settlements , which are located on the Meuse and in the foothills and hilly interior, showing a more advanced civil level inherited by Merovingian and Carolingian. The original settlement of Liege is located at the intersection of territorial routes related to the axis of the river Meuse. A Roman villa dating back to the 1st century is the core for a new settlement during the Merovingian era. From a first settlement system consisting of scattered houses, especially in the Place Saint Lambert, we notice to a planned structure on the route towards the Publémont, with very large batches due, in all probability,to the typical size of the Roman home courtyard. The 10th century in the whole area of Wallonia and Liege there is a different organization of the settlements undertaken by the bishops, that install great cathedrals and starting an extensive subdivisions of the land extended up to the settled area introducing the type of the row house. The phases of the urban organism were reconstructed correlating together the historical data with the specialized buildings and the reality, detectable through the 19th century cadastral; the urban organism seems to find a progressive and controlled development until the 19th century. After that, there is a substantial transformations of closed canals that change the structure of the place and the organic nature of the urban system.

Introduction

The research about the City of Liege was realized within the activities of the Final Workshop of Degree coordinated by the Prof. Matteo Ieva and by undergraduates R. Ieva, R. Natale, D. Ranieri, C. Piccione, G. Pulimeno, E. Savino in course of degree in Architecture DICAR Department of Politecnico di Bari.

It has been elaborated thanks to the colleague's of the university of Liegi precious contribution, in particular, P. Hautecler, R. Occhiuto, M. Goossems, with which the achieved results have been shared.

The study reconstructs the formation of the different phases of the major Walloon city.

The analysis of the typological process, performed by different scales of the man-made space, allows to reconstruct the dynamics of the formation of the city in the North of Gaul.

The method used for the territorial scale, also extended for the entire Belgian Walloon region, points out the birth of the first settlement on the current urban site near the river Meuse, at the confluence of the major territorial routes crossing the strecht where the river, that branches into several canals, flows in a flat area between some hills.

Established initially in the wide valley during Roman Age, the town developed later on the cape during the Middle Ages. The original structure of the settlement is based on the matrix route north-east south-west, which runs alongside the Meuse on the left, alongside the promontory of Sainte Walburge and Publémont at an higher altitude.

In the early centuries of the Christian Age, this route of riverside is connected to the road that links Tongeren to Treves, crossing the river in the north to the agglomeration of Jupille and continuing towards north-east to Maastricht.

The Roman occupation of Place Saint-Lambert in the late first century AD is certified by the discovery of a villa in classical style, which has a representative function.

In the following centuries this villa is built around a large central space; the rooms are distributed according to a strict symmetry axis directed towards the alluvial plain of the area where it stands. Many sources report the villa as an isolated example, while the strategic position reached among the different territorial routes, confirmed in the following centuries, suggesting a greater importance of the site that probably, as well as having mercantile function, had a building that was considered the most important and that was juxtaposed by other small buildings scattered along the route.

This first set, which is configured as a cluster along the main road and is connected to a large building of control, produces a progressive hierarchy of distances crossing the Meuse as a result of exchanges between the communities living in this land, especially to the ford to Germany and routes with lower section of the riverbed towards Huy.

Formation of the settlement and the urban nucleus

The reconstruction of the city founds in the historical events the foundation on which the historical and processual analysis reconstructs the formation and transformation stages of the urban scale and aggregative. These historical events will be shown below as a chronology.

The birth of an organized settlement was recorded after the siege of the barbarians around the structures of the ancient Roman building that becomes the pole of the village which will be structured in the Merovingian era.

The archaeological remains point out the presence of a few scattered houses in the area of Place Saint Lambert influenced by the presence of the Roman villa. It also certifies the presence of a cemetery on the slopes of Publémont declaring the importance of the route and its continued use.

Between the late seventh and early eighth century, when the Bishop Hubert, following the martyrdom of Saint Lambert, moved the seat of the diocese in Liege, the city is mostly a small cluster distributed on a matrix route conditioned by the presence of previous Roman organization of which remain intact vestiges.

The religious center became a place for faithful people. Bishop Hubert expanded it to accommodate the pilgrims: he built a Martyrium apsidal which was in the area of the for-

mer Roman villa, attached to the previous oratory dedicated to the Virgin, but with different orientation. In the cemeterial area, the Bishop built the church of Saint Pierre that will become one of the nine collegiates of the city, destined to the future burial of the Bishop.

In this period the first defensive structure took: the castle Saint George set between the territorial routes to Maastricht and Tongeren, located in the current district of Hors-Chateau. It consists of a large series fortified walls in which people could hide in case of attack by the enemy soldiers. Today there is no certified trace of the site remainings, although there are some writing in the ancient sources about a series of alignments within the impasses near Rue de la Brasserie, rue de la Poule and Rue Velbruck, made from old sandstone walls. On the other hand, observing the plan register of the XVIIIth century, the particles of this neighborhood are all aligned, being arranged on junctions of traces of these findings.

The discovered structures, with which the archaeologists would like to reconstruct the development of the urban planning at this stage, are unfortunately few, because of the geological nature of the soil and the serious alterations that the city suffered as a result.

Historical sources state that in 881 the city was sacked by the Normans. They demolish large buildings that were distributed in the valley. Almost a century later, in 954, the Hungarians also flatten the city. Due to the importance that Liege was progressively assuming, the following succeded bishops built a castle as a city fortress.

The tales narrated by Jean D'Outremeuse relate about the castle of Saint Michel, based on Publémont to protect the diocese in times of crisis. There are not other tracks of the castle, except the rows of the lower wall of vintage Notgerian age that seem to be dated to an earlier period and probably correspond to this source. Other signs can be identified in the cadastral of the XVIIIth century which presents alignments that coincide with the reconstruction of the fortress wall. The cadastral also presents a structure completely separated from the pertinent strip, that interrupts the serial dimensional readable in the district of Saint Martin and precisely in Rue Mont Saint Martin nowadays.

Instead, in the highest part of the promontory, there are still lots of modular dimensions, whom average size is about 15 meters in front of the road and 20 meters in depth, much more extensive than those that appear along the continuation of the path that are narrow and elongated. This configuration of lots, as evidenced by the ancient sources, testifies the presence of homes reserved for canons placed in a wide perimeter that juxtapose the collegiate. A particularly significant document -"*la chart du 2 juin 965*"- tells the will of the bishop Heracles. He wants to move the "siège episcopal" in a more elevated site to reunify the whole monastic order in an unique area. This configuration corresponds to the so-called "maisons cannonial", supported also by the designation of some still existing historic buildings and the foundation of the new collegiate church of Saint Martin.

An important turning point in the urban system of Liege correspond to the birth of the Principality of Liege. Thanks to the displacement of the diocese from Maastricht to Liege and with the increase of the faithful in the city for the spread of the cult of Saint Lambert, there are many initiatives from the Bishops to enrich the city centre. A fortification, partly built on the highest part of the castle of Saint Michel and in the lower part of Saint Pierre, enriches the Publémont. It could correspond to what some sources report as the castle Silvestre. This castle has a threadlike form. About its existence there is much debate between historians who claim that it is the original residence of the bishop, and the ones who states that it is the palace of the Prince-Bishops still not existing. This area, which encompasses the collegiate of Saint Martin, includes alignments marked by steady pace previously mentioned.

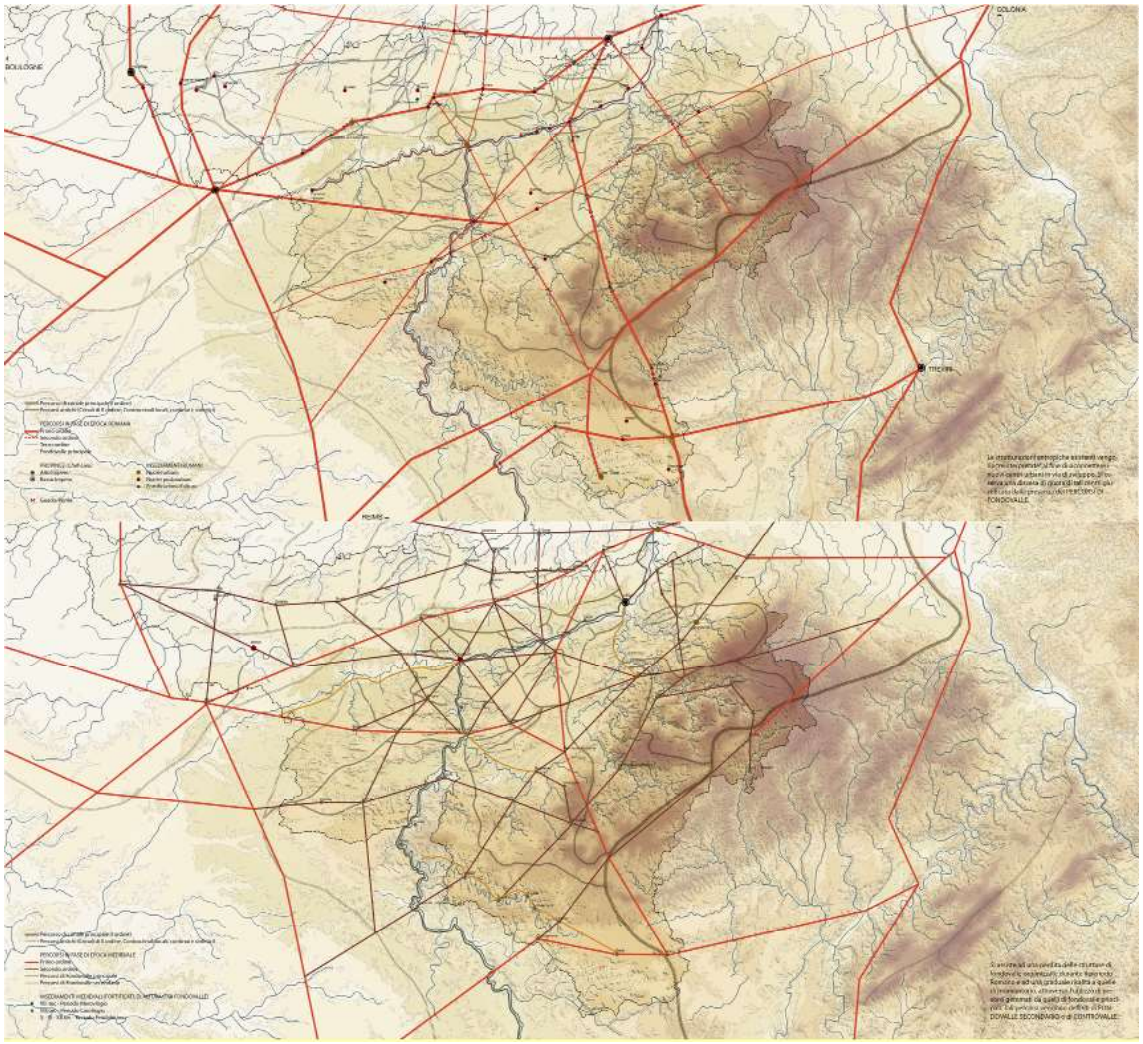
Notger, bishop in 972 and crowned Prince-Bishop by Otto II in 980, gives to Liege the size and the luster of a Principality. Its new urban vision reflects the prestige given to the city.

The Prince-Bishop fortifies the city with a large wall, which unifies the built on the hill of Saint Martin with the downstream, and he completes the great-specialized pole in the Place Saint-Lambert, with the construction of the Cathedral, the Palace and the Carolingian church of Notre-Dame au font.

Liege is adorned by the first collegiates starting from the construction of Saint Croix, near the ancient Saint Pierre, Saint-Denis and near routes crossing the river.

The bishop government built some parish churches, religious structures for the canoni-

Figure 1. Territorial scale analysis – description of the antropical structuring phases of the Roman and Medieval ages



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cal point of view, not at the service of the community, as example: Saint Servais, built in the northen way towards Tongeren; the small parish of Saint Georges, which name remembers a previous defensive castle built in the past.

The bishop also encourages the settlement on the island formed by the Sauveniere, a branch of the Meuse now dried. This part will remain outside the walls until the thirteenth century. The island, crossed by a territorial route that links the city with Huy, observes in this age the completion of construction of the collegiate church of Saint Paul that will be placed at the end of the route. It also started the foundation of Saint-Jean Evangeliste, which recalls the highly organic structure of the Palatine Chapel of Aachen with its polar system.

As you can easily deduce, there was no other urban contemporary city like this in the Northen Europe. It was an unique phenomenon to admire the presence of a so conspicuous large collegiate and of a religious complexes that have given rise to a varied urban structure, precisely determined by the presence of large specialized organisms, houses of the canons and basic building for the community.

By reading the cadastral of the XVIIIth century and some existing documents, it is clear that the system of aggregation of residential building around the collegiate is very similar to the mechanics of structuring documented in the area of Saint Martin. A partial construction in adherence to the matrix route and an pertinent area used as a garden characterized the lots for the exclusive use of the canons, which ranged from 120 square meters to

Figure 2. Hypothetical urban development of the city of Liegi – from I to XII century a.C.

3,000 square meters. The aggregate, which initially runs along a wide route, will be structured around a square connected to the collegiate for those that will be built later.

Residential buildings affect the space between the various collegiate, in lots of much smaller size. The lot seems to vary from a large module, perhaps of Roman origin, to an intermediate dimension. These intermediate lots have a mean amplitude of about 10 m on the road front (located on the slopes of Publémont), to a more reduced size variable between 5 and 3.5 meters wide on the road and a deep conditioning by the orography of the terrain and, it would seem, even social status.

From the XIth century, the city shows significant changes on the urban arrangement. Thanks to the economic revival that animated the whole valley of the Meuse, Liege becomes a big city with a strong element of commerce. This results in a large influx of immigrants from neighboring rural areas, which determine the population of large undeveloped areas, in and out of the notgerian city.

The construction of many routes and bridges characterize the settlement of this phase to promote contact with the most important commercial centers. The road to France, rue Saint-Gilles, directly joined to the city by the Pont d'Avroy, while that for Germany is available through the Pont des Arches.

In 1008 Notger's death does not stop the project of urban expansion that will be carried on by his successors. In particular, the Prince-Bishop Balderic founded the Abbey of Saint Jacques on the island, named collegiate only in later centuries. This collegiate will have great historical, worship and especially urban rilevance although it is far from the major territorial route. Balderic also builds the Collegiate Saint Barthélemy in the Northern area of the city, along the historical territorial route that in this period connects Maastricht to the Principality. The nine collegiate completed embellishing the episcopal city until the French Revolution and in part today.

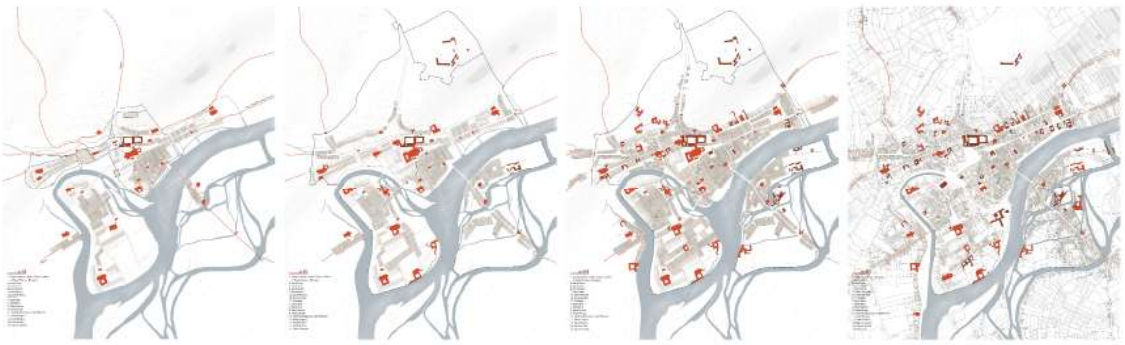
Areas easier siege as the area of Saint Denis in the valley, the branch of the Publémont Souveniere and over the palace of the Prince-Bishops, in proximity of the hill, are completed and reinforced with a double wall of fortification. The palace, whose foundation could be dated in 1015, has not a certain original shape, but it is known that is based on some large courtyards as the current building.

The basic aggregate thickens more within the walls going to settle on the matrix route and growing in the valley near the special pole. The different streams that branch out to the mouth of Legia strongly influence the development of new routes and the resulting pertinent strips.

Outside the walls, some matrix routes link various notgerian buildings (such as Saint Paul, Saint Jean, Saint Barthélemy, etc.), along the lines of foreign regions. The new construction of river crossings, as with the district Outremeuse, facilitates this phenomenon.

The parishes of next construction gradually become urban nodes on which will be consolidated in the new districts. Twenty-four parishes destined for the faithful, including seventeen parishes in the notgerian walls divide the territory.

Figure 3. Hypothetical urban development of the city of Liegi – from XIV to XIX century a.C.



In the XIIth century, the brassing of brass and bronze allows a further increase in trade and Liege become a center of attraction on the Meuse.

In these years Liege suffers a devastating fire broke out from the houses that flank the cathedral of Saint Lambert. The massive fire will lead to restructure most of the buildings of the pole in Place Saint Lambert. The cathedral itself, which undergoes small changes over the centuries to its general layout, will remain an open-air workshop that will end only in the XVth century.

Between the XIIth and XIIIth centuries, the Principality is forced to raise new walls to defend the whole town; in the meantime developed extramural being already saturated the inner to the previous circuit. The construction of new fortifications, which include the region of the Sauveniere and the Outremeuse, will take place in conjunction with the Paix des Clercs (1287) that establishes the territorial unification of Liege.

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In this phase it is possible to witness the rapid urbanization of large areas with basic building also extended to the suburbs and the creation of new ecclesiastical centers, promoted by monastic orders. At the same time, there is the construction of new neighborhoods connected with the commercial nature of the area in expansion.

At the end of the century the city was largely destroyed by the Duke Charles "the Bold" as a result of the resistance of the Principality to the policy of the dukes of Burgundy. The face of the consolidated medieval town, which was set up along the Meuse, seems to dissolve completely.

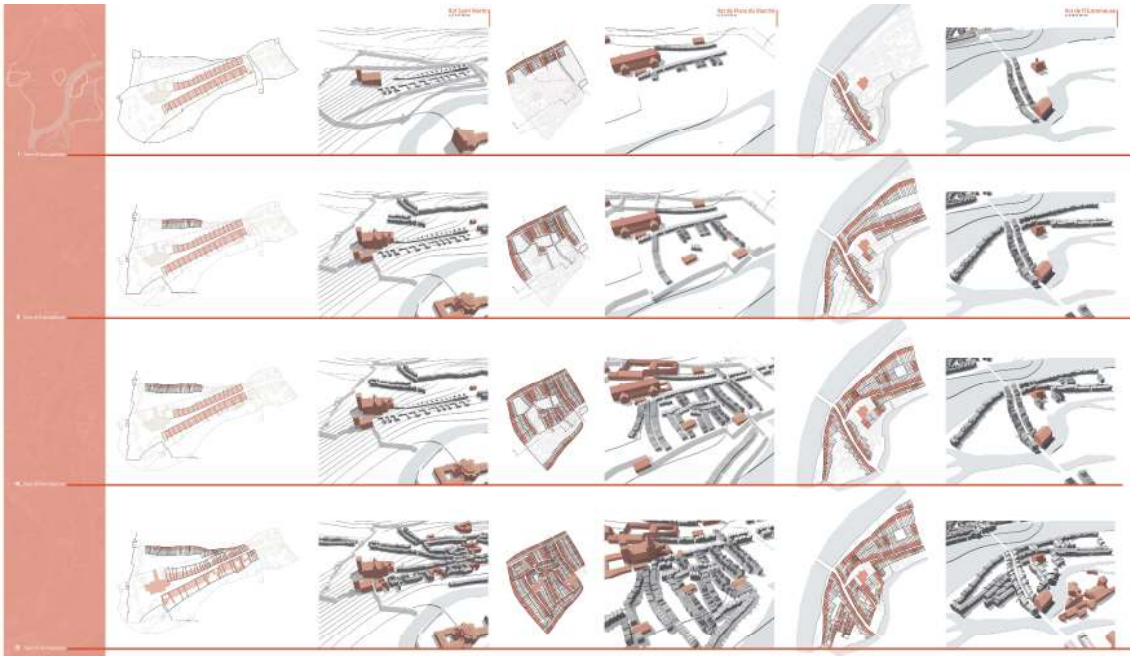
A new revival of the city takes place since the XVIth century through the growing economic development resulted from the extraction of coal and from the manufacture of weapons. With the reign of Erard de la Marck (1505-1538), coinciding with the arrival of the Renaissance, the city changes rapidly with a new urban aesthetic hybridized by cultural characters from Greater Italian. The whole city center undergoes a phase of reconstruction. The Gothic cathedral is finished with imposing proportions that attest to the uniqueness of his role at the urban scale. With the reconstruction, all the most important buildings, including the collegiate, take most impressive sizes, but always subordinate to the main Gothic cathedral.

Between 1526 and 1536, the Prince-Bishop Erard de la Marck gives a new impetus to the transformation of the Palace of the Prince Bishops, which becomes more and more representative of the local religious-political power. The architect Arnold Van Mulken was in charge to the work of renovation.

Following the religious value of Liege, various monastic orders, set up in the city, build their new abbeys and monasteries, many within land sold by large religious property near the city center.

Other similar settlements are found in the vast peripheral areas, to the promontory of Sainte Walburge and the district of the Outremeuse. In the latter, the aggregate finds another expansion across the river, but its appearance does not define a set of regular

Figure 4. Reconstruction hypothesis of the formative phases of the urban aggregate of Saint Martin, Saint Lambert and Outremeuse



built because of the constraints generated, probably, by the presence of small canals and/or arms of the Meuse. Despite this anomaly to the urban structure, it is not be inferred from any document. Both the cadastral of the XVIIIth century and nowadays ' buildings testify the existence of lots of irregular shapes that are not perfectly parallel. In areas less influenced by waterways, buildings are restored, however, the aggregative laws already known and frequently also in neighborhoods expansion.

New public buildings such as Violette (the town hall) are placed in the urban nodes of the city. On the promontory overlooking the Meuse, the Fort of the Citadelle dominates and protects the town. In the vacant land of the collegiate or instead of residences designed in the past for the clergy, building new private special buildings, such as the palaces owned by the local bourgeoisie.

The streams resulting from Legia mark and condition, even at this stage, the territory of the center is largely filled through vaulted structures leaving areas available to the settlement. Finally, in the XVIth century, following the intensification of the river due to the transport of iron ore, there will be the new port calls of the Meuse.

During the rule of the bishops of the House of Bavaria (17th century) and until the political events in the late 17th century, Liege lives an era of prosperity thanks to the manufacture of firearms.

The revolution, the subsequent annexation to France on 1 October 1795 and the Concordat of 1801 involve the destruction and dismantling of numerous parish churches and many of the great collegiates. The greatest loss is undoubtedly the demolition in 1793 of the prestigious cathedral of Saint Lambert. The dismantling of the remains has left a void in the center of the city that still exists today. Even the demolition of Saint Pierre in the early '800, the oldest of the collegiate, causes profound changes in the spatial relationships between the buildings.

In the XIXth century many areas are progressively destroyed with reused buildings different from medieval ones, as can be seen by comparing the old cadastral with the present one.

Urban changes of the XIXth century and the today's criticality

With the United Kingdom of the Netherlands, succeeded to the French regime, Liege finally enters the industrial era. A major reorganization of the urban tissue, with demolition of most of the ancient buildings that maintain open spaces for new buildings, is the result of this revolution. A modern special tissue takes, sometimes, the place of the previous Renaissance structures, such as hotels particulier, palaces settled along the matrix route (on Publémont, Hors Chateau and Feeronstrée) and Hopital, filling the remaining free spaces of the suburbs inside the city walls.

The conquest of the area peripheral leads, therefore, the consolidation of neighborhoods like the Outremeuse (on the right bank of the river), Saint Leonard (to Maastricht) and Sainte Walburge (towards Tongeren).

The economic boom enjoyed by the region at this stage until the Great Depression of 1929-1930, has an immediate impact on public works that involves several changes in the general appearance of the city. The most important decision was to demolish the cathedral. In 1827, the place gradually becomes the focus of traffic and the focal point of a very active trade. To the North, the facade of the Palace of the Prince-Bishops solemnly closes the new space, and in 1885 with the construction of the so-called Grand Bazaar there will be defined prospects that surround the square.

At this stage major engineering works, acts to gain ground, leading to the correction of the main arm of the river, filling the bays and drying up small streams arising from the Meuse that still plow the urban soil. This leads to the definition of the current district of the Outremeuse surrounded on the Western side from the main axis of the river. On the eastern side the new canal called Derivation has been created. The construction of new buildings and the creation of the Parc de la Bovarie saturate the area gradually reclaimed. This new set-up leaves little space to the original relations established between routes and pertinent strips, readable only at certain points of the cadastral. New large bridges and wide streets for the rapid flow, also called Boulevard, affect the routes that cross this area. Even the riverside is no longer direct junction between the water and the built, but only the driveway.

In 1844 the canal of the Sauveniere is completely drained to make way for the Boulevard of Sauveniere that continues Boulevard d'Avroy. Both, established thanks to the great engineering movement of reclamation, create new possibilities of settlement that result in the construction of neighborhoods in the neoclassical style and in large urban projects for the organization of public space and urban green. Interesting are the plans for the accommodation of the Parc d'Avroy, terrasses and the Jardin Botanique.

The Guillemins, the railway station built in 1842, is built in the spaces still unbuilt, in close relationship with the new routes. The cadastral of the XVIIIth, used as a base for a cartographic analysis, shows the beginning of the progressive control of the territory initially occupied by water. So in the old riverbed of the Sauveniere is built the Théatre Royal which interacts with the urban void of Place du Marché.

Finally, the construction of the railway station Longdoz, which joins 1861 Maastricht to Liege, in South's peripheral area across the river, determines the extent of a commercial and industrial area, which joins the long production history of Liege.

Currently, the city has suffered a setback in the industrial sector. As a result, large foundries at the edge of the suburbs were closed and abandoned. Now they represent, on the one hand, a great impediment to the possibility of growth of the city, on the other one, it opens the problem of reuse making it subject to recovery or possibly of the demolition. The service sector has become the driving force of the economy of Liege.

The reduction of the many tributaries of the Meuse, for large expressways, has helped change significantly the original urban structure. The suburbs suffer instead the phenomenon of sprawl and the progressive dilation of the town, in absence of a sense of aggregation that dissolves the urban design to the green and the countryside.

Furthermore, the anxiety of renewal that seems to characterize the recent initiatives projects the city in an international debate. It goes in search of a new image without giving up to the interventions of transformation of the built that renews the old tissue changing the face of the consolidated historical city.

Examples of these trends are the new station Guillemins (important work of architect Calatrava), the tower of the Ministry of Finance and the comprehensive revision that involves the connection of the center with the financial structure of the large coverage mall Mediacité.

Conclusion

The brief reconstruction of the dynamics that characterized the urban context of Liege highlights the character of urban ensemble consisting of serial aggregates organized around the great religious complexes, but reaching the total organic with difficulty, because this urban system is also a summation of organic elements. This was indeed caused by the condition of the birth of a collegiate service of the clergy placed in episodic spatial locations, although influenced by the structure of former routes. The neighborhoods that have gradually implanted had apparently reached an equilibrium, with both the organization of the collegiate (such as building regulations) and with the community of canons, that both relate to each other in a single urban organism.

Despite having suffered a substantial modification in the XIXth century, the undisputed balance achieved by the city at the end of the XVIIIth century has found its re-measured polarization with the addition of new special buildings in the most important nodes of the tissue. This ability to control the urban structure seems to have entered a deep crisis with the recent transformation projects and urban renewal, as well as showing little interest (public and private) to preserve the historic tissue as evidence of civilization. It is possible to add the indifference to the monumental collegiate, which has become unused and then left in a "barbaric" destiny.

References

Caniggia, G. and Maffei, G. (1979) *Lettura dell'edilizia di base* (Marsilo editore).
Delvaux de Feneffe, A.,'Liège. Quelques transformations. Visages du passé. Avec 57 ill. (h. t. en noir).', Liège, G. Thone, s.d., gd 4°, br., couv. plasti-fiée.
Lejeune, J. (1996), L*a principauté de Liège* (Editions du Perron).
Muratori, S. (1963) *Architettura e civiltà in crisi* (C.S.S.U.).
Strappa, G., Ieva, M., Dimatteo, M.A. (2003) *La città come organismo. Lettura di Trani alle diverse scale* (Adda Editore).
Strappa, G. (2014) *L'architettura come processo. Il mondo plastico murario in divenire* (Franco Angeli, Milano).
VV.AA. (1992), *Les fouilles de la Place Saint-Lambert à Liège*, Vol. 4: Les églises, Eraul 57.
Nagelmckers, A. (1978), *Liege strategique du VI au XI siècle, ses chateaux ses fortification.*
VV.AA. (2004), *Patrimoine architectural et territories de Wallonie LIÈGE, ministère de la region wallonne* (Mardaga, Sprimont).
VV.AA. (1974), 'Le patrimoine monumental de la belgique'. Vol. 3: *Liege. Ville de Liege, ministère de la culture de Française* (Soledi).
VV.AA., (2009) 'Saouvenir et devenir dun quartier', Catalogue édité à l'occassion de l'exposition organisée dans les locaux de la Banque de SCHAETZEN du 26.09 au 16.10.89.

Methods for operating on historic city centres. Reflections about Gianfranco Caniggia's writings

Marta Burrai, Alessandro Oltremarini
Draco PhD School, "Sapienza" University of Rome, via Gramsci 53A, 00197, Rome, Italy
Keywords: Rome, voids, type, historic city centre, process

Abstract

This paper explores the issue of architectural design of the italian historical city, analyzingGianfranco Caniggia's selected essays.

The research work defines two main areas of interest: the first area identifies the appling of the typological process (as a succession of temporal mutations and spatial distinctions, and their mutual influences) of projects for Rome (Parliament Building, Lungara street, Giulia street and Moretta alley, and San Giovanni dei Fiorentini) and Naples (San Petrillo block, Santi Giovanni e Paolo tissue, e Spanish Quarters) according to the appropriate scalar components (from elements to organisms), through which it is explained completely the method developed by Caniggia from the topics covered in Conferenza Nazionale dei Centri Storici (1975); the second area is focused on the general Caniggia's methodology that, through the development of the typological reading-designing method, has given solid application at the critical thinking of Roman school based on the value of history, and its impact on the rehabilitation of new design developments.

Introduction

Our work examines the method for operating on historic city centres by means the analysis of the project about the "Rome's voids" and the reflections about Gianfranco Caniggia's writings.

We believe that this debate is more relevant than ever, especially in the area of the project analysis, in particular Piazza della Moretta and Via Giulia in Rome, still unresolved node of an urban tissue that sees the consolidation of opposition between spontaneous and planned city, between the old center and progressive expansion. According to Caniggia, this opposition has allowed to think about the growing separation between urban planning and typological process.

With the *Project of 1981-1986 about the historic centre of Rome*, the Committee for Works in the Historic Centre[1] recommends different initiatives to "transforme the notable delay of Rome's adaptation to becoming the capital of Italy, into the potentiality of becoming a different capital, a truly contemporary one"(Aymonino 1990).

This was the case of the call made by the Committee along with *Cooperativa Architettura Arte Moderna*, inviting a lot of Italian architects to present ideas, proposals and projects (Aymonino 1990), setting up several design. Workshop n.5[2] (which focuses on the "Voids"of the historic centre) hosted, among others, Gianfranco Caniggia.

In its Introduction, the participating architects were instructed to tackle "a number of irregular spaces, which have been cut out from the dense tissue of the renaissance-baroque city, to intervene – or not – with new architectures and to solve old urban gutting problems"[3].

Caniggia and his team had to "bring forward the possibility of reconstructing the continuous city, patching its lacerated parts with a tissue (…) derived from and redesigned on the basis of the reenactment of the genesis-modification of the configuration of its built spaces" (Caniggia 1997).

Coherence of composition

Our project examines the projects for Via Paola, Via Giulia and Via della Lungara. These communicate with themselves for their *coherence of composition* which puts together (composes) the system of the historic city - strongly characterized by its residential use (in the East of the Tiber) - with the specialized buildings beyond the river.

The projects want to express the tendency of cities to change over time; the mutation is not a result of occasional events, but is the coherence between each building and the urban system.

The objective of the project is to reestablish an organic correlation with the new built areas (Caniggia 1997) starting from the comprehension of the *hidden structure* of the City of the Past, so as to be able to individuate coherent and systematic design methods.

The Caniggia's analytical study proves that the area of Via Lungara (and Piazza della Rovere) is linked to a "radical change realized by the introduction of new only reversible infrastructures", particularly the Tiber; Via Giulia and Vicolo della Moretta's plans foresaw

[1]The committee was without budget and was created by Giulio Carlo Argan, mayor of Rome since 1976 to 1979. He resigned for health reasons and was succeeded by Louis Petroselli, died in 1981. He was replaced by UgoVetere, former councilor to the budget of the junta Argan. In those years, Renato Nicolini was the councillor of Culture (1976-1985) and Carlo Ayomonino was the councillor to the Interventions on the Historic Center of Rome (1981-1985). Those years do not coincide with the whole mandate because the elections were moved up a year earlier, losing that "twenty per cent which corresponded to the operation of many initiatives" (Aymonino 1990).

[2]It is a planning workshop about the "voids" of the historic center, such as Piazza della Rovere, Piazza della Moretta, via dei Polacchi, the final part of Corso Vittorio, Piazza del Parlamento. In addition to Gianfranco Caniggia, the other architects who participated are: Michele Beccu, Giangiacomo D'Ardia – Ariella Zattera, Vittorio De Feo, Massimo Fortis, Paola Jacucci, Antonio Monestiroli, gianni Motta, Dario Passi, Marco Porta, Giuseppe Rebecchini, Agostino Renna, Roberto Secchi, Franco Stella, Laura Thermes.

[3]By presentation to workshop.

the connection between the Lungotevere dei Sangallo and Corso Vittorio Emanuele in continuity with Ponte Mazzini: "they are not some accepted plans and projects by the place, therefore never completed, and so punishable by the maximum reversibility" (Caniggia 1997). Then, there is an intermediate situation, the area of San Giovanni dei Fiorentini, where was planned the direct connection between Ponte Principe Amedeo and Corso Vittorio Emanuele.

The project attempts to reestablish the hierarchy of infrastructures within the project area. Corso Vittorio Emanuele remains the main infrastructure that connects the two banks of the Tiber.

The severed intersection with via Paola is reconsolidated, bringing it back to its former aspect, thus restoring the trident of roads and also allowing the facade of San Giovanni dei Fiorentini to act once again as the renaissance backdrop of the crossing.

The project suggests the homogeneous rebuilding of the street front of via Giulia; this front belongs to a solution that confronted with the gap between Via Giulia and the Tiber, especially in dialogue with the Ponte Principe Amedeo and with the tunnel (now Galleria Principe Amedeo). *The awkward presence of the Lungotevere* (Caniggia 1997) is overcome with the aid of a vehicular underpass that begins from Ponte Vittorio Emanuele up to Regina Coeli prison and Ponte Mazzini.

The project belongs to the category of *continuous processes*, in order to renew the old city centre and the portions of tissue aimed at reestablishing the historical-civic continuity of the cluster.

Specialized buildings

In particular the renewal, or recovery, of specialized buildings has a less rigorous processuality than basic building[4].

The project considers the demolition and rebuilding of Liceo Virgilio "in form of unit building, with wall rhythmic, ensuring the readability of the distribution system and of the accesses with a hierarchy of margins reflected by the differences of the buildings and by the quality of open spaces enclosed, and equipped with an assembly hall emerging" (Caniggia 1997).

The compound of Santo Spirito Hospital (built in the 1930's) has also to be demolished and substituted by "a larger building, allocated to the same purpose". The project will also include "the rebuilding of a strongly serial facade and high length" that "is associated with the logical specialized buildings over the Tiber" (Caniggia 1997).

The basic cell thus becomes the unit of measurement of the specialized buildings, where, acting in seriality, it is manifest and acts as the matrix of the pattern.

The measurement process is done through the identification and repetition of serial unit that becomes, in this case, *hidden phenomenon to arouse and show off* for the organic relationship with the tissue.

Basic Building

Through the reconstruction process "logical-analogical phases of training-mutation" (Caniggia 1997) Caniggia and his team have identified the characteristics of the first building type (coeval plant tissue land and road) and of the typological process (peculiar each urban location)[5].

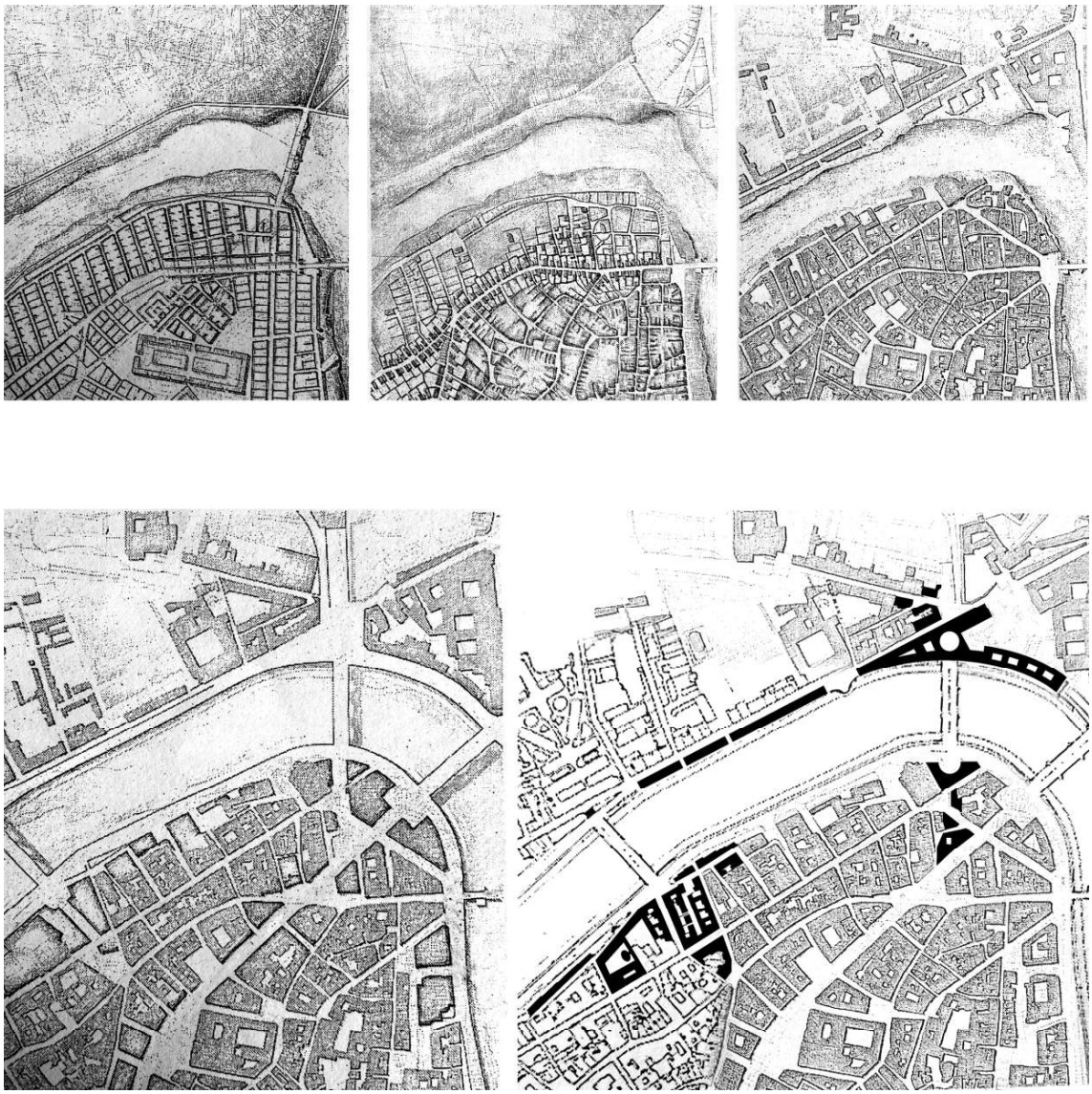
The identification of specific types[6], which stands as a priori synthesis of the project,

[4]"(…) As long as you remain in the field of basic building, the intentionality and specialization cannot grow much, for the substantial correlation between existence and house, which does not accept changes beyond a limit, constantly influenced by the immanence of a *basic building type* relevant to a more rigorous process of mutation, than has the processuality of specialized types". (Caniggia and Maffei 1979).

[5]For typological process Caniggia means the sequence of organic building types, concepts of house mutants gradually over time.

[6]"From the Catasto Piano-Gregoriano and from the previous archive documents, it is possible to see the demarcations of "domus" area readable as similar dimensions that, normally, consist of

Figure 1. Plan of the project area. Top: the situation in the first building, the situation in the Middle Ages and the situation after the construction of the Tiber. Down the situation at the time of the proposal and the project. The redesign of the project is done on the basis of drawings found in archives. Pictures of plans are taken by Ragionamenti di tipologia



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three following row houses: typically, the size front of them is not constant, unlike fabrics row houses of contemporary plant building. On the contrary, it is possible distinguish clearly, among these, the most remote house placed with the best solar orientation, and originally joined by the court: the outcome is known from the dequantification of built of the domus and of its recession in the form of *domus elementary*, or rather, the courtyard house with its orientato built. It seems equally clear the progressive engorgement of the court by the well-known phenomena of "tabernization" and "insulation", characteristic by middle and lower medieval densification, especially the longitudinal routes are interesting".

allowed to the same characters to generate the conditions for a compositional coherence of the project.

The project involves restoring the historic tissue gutted because of the previous plan, never finished, that it wanted to connect the ponte Mazzini and Corso Vittorio Emanuele with the inclusion of "large specialized buildings, unjustified because of the low nodality of the area".

The proposal is the "revival of the residence, similar to that which the area has had in its first building" (Caniggia 1997). The application method of the intervention starts up a continuous system of permanences and mutations moving from the urban scale to the architectural, from the permanence of the tissue to the mutations of the type[7].

The builtlot proposed in the Piazza della Moretta is inserted in a focal point of the urban tissue by relating around through a necessary hybridization that, in its exceptional composition made of variants rather than of rules, establishes an organic continuity with the fabric.

With a row house bicellular in depht with court, solutions predominant refer to multi-families buildings, obtained from a doubling of the double cell and therefore constituted by a plant of four cells.

The urban organism is the result of organic aggregations. Each of them establishes a different angular solution. The over all objective becomes, on the one hand, the return of the Vicolo della Moretta, through the basement of the block boundary, emptied in elevation to allow the best solar orientation of the side delimited from the Vicolo del Malpasso, and on the other, the restoration of the continuous front of Via Giulia.

For this, also, the front of the builtlot overlooking Via Giulia comes into organic relationship with the front of the builtlot of Piazza della Moretta: coherence of composition is expressed in the revival of aggregations (this time tend serial) of building multi-family houses buildings.

The completion of the relevant side of the Liceo Virgilio situated in the Vicolo dello Struzzo, is constituted by a relatively serial aggregation of three elements which extend transversely to the street, for a depth equal to three cells.

The area bounded by Vicolo dello Struzzo, Via Giulia, Vicolo delle Prigioni and Via della Bravaria, is crossed longitudinally by Vicolo della Padella, "distinctly antinodal", dividing it substantially in two blocks that on the front of Via Giulia, with the exception of the ground floor, join together, thus contributing to accentuate the continuity of the street.

About the Vicolo delle Prigioni, the system is very similar to that we previously described. The meaning of the court changes, thanks to the revival of the insulation process. In this process work, there are the rowhouses to which is possible to access from the Vicolo della Padella.

It is interesting the transition that takes place from the body to the heads. Especially with the head of the Via Bravaria, through an axis parallel to Via Giulia which connects ideally the same block with the other portions of the completion of the Liceo Virgilio and of the head between Vicolo della Scimmia and Via della Bravaria.

The axis is formed by the repetition of the elementary cell which is in the general matrix of the tissue and manifests itself through the alternation of empty and full spaces, and courts, that are in continuity and compositional coherence with the entire typological intervention.

Also the head that runs from Via della Bravaria to Via dell'Armata is done by rowhouse bicellular in depth.

The system follows two main axes: one perpendicular to Via Giulia and the other one is parallel to Vicolo delle Prigioni.

[7]"The design of the residential fabric was based on the redesign of the formation process starting by the plant of the subdivision in domus and the different mutations that have undergone depending by both their specific location on the paths and their isorientamento: more *insulizated* to become rowhouses with the court turned into a collective area of relevance, on the edge of the Vicolo delle Prigioni; finally, those in the Vicolo della Padella, distinctly antinodal, are more adequate for the mutation in the courtyard house; the domus being in the Vicolo dello Struzzo, in adherence to the perimeter of the Collegio Ghisilieri, are interested in an intermediate mutation. The margin affected by Via Giulia appears changed in the form of multi-family house deriving from the recast of the previous rowhouses. Towards the Tiber, we have proposed the gap with via della Bravaria and via dell'Armata reforming a linear rowhouses tissue in mediation between the level of the Tiber and the original level currently separated by incongruous embankments"(Caniggia 1997).

Figure 2. Ground floor of the project about Piazza della Moretta and part of Via Giulia. Redesign of the authors

Four elements onto a courtyard roughly the size of two cells, leading to a reduction in the depth of the pair of rowhouses to which corresponds by the court.

The entire axis is spread evenly, stopping at the Church and constituting Piazza della Padella.The front street is characterized by the serial rhythm of the accesses and the ascents, which also includes the treatment given to the front of new Liceo Virgilio, and the linear tissue made by rowhouses which allow to overcome the height difference from via della Bravaria and via dell'Armata to Lungotevere.

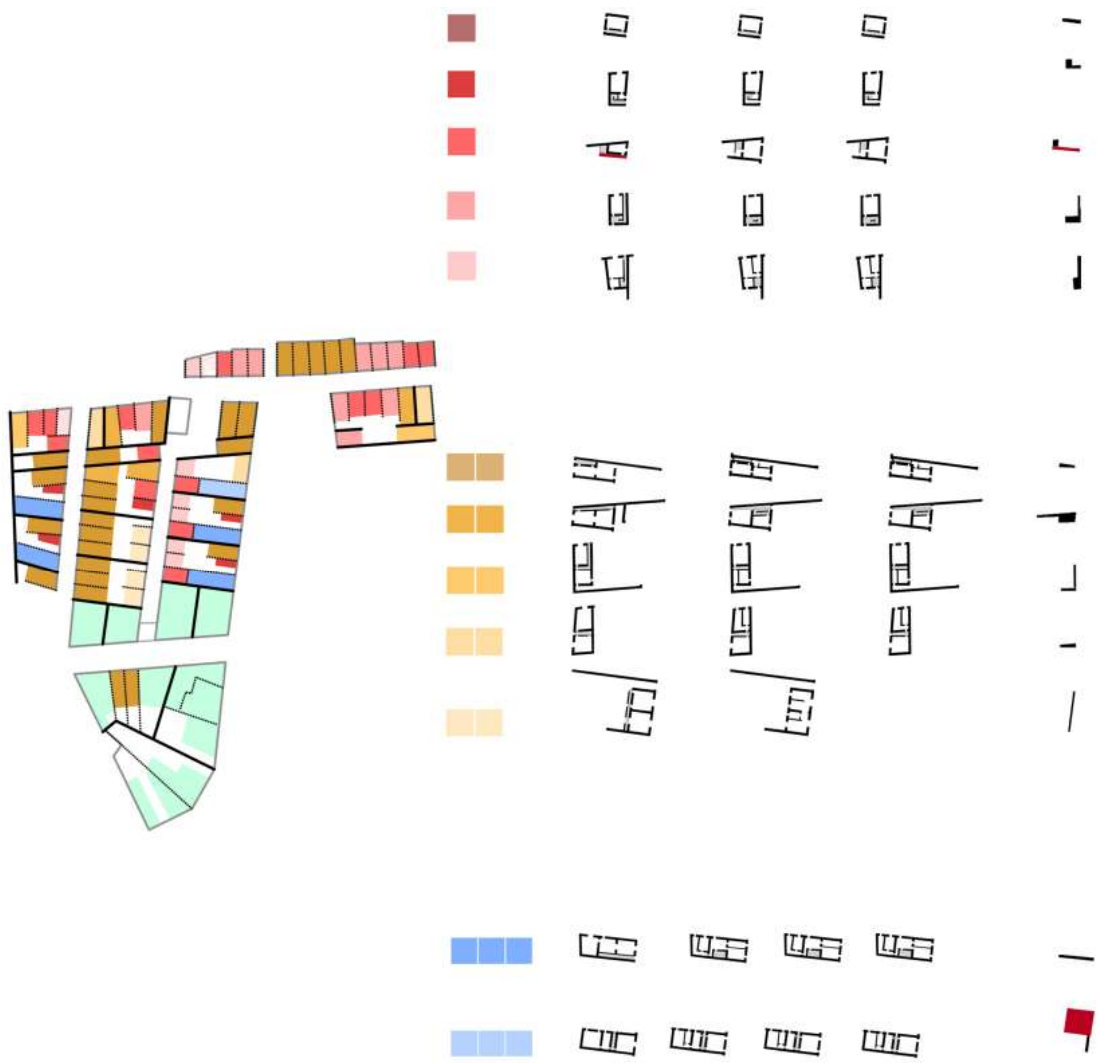
As in the case of the project for Via della Lungara, the objectives are to render to the tissue its "sense of belonging to a contrada" (Caniggia 1997) which vanished with the position of the Lungotevere.

This solution, therefore, is in continuity with the historic fabric prior to the demolitions, and complete the heads of the blocks "mediating between the level of the Lungotevere and the original street level, which are now divided by illogical embankments" (Caniggia 1997).

The base type of the elements is the row house, declined into three variations which depend on the number of cells: one cell type, bi-cellular type, three cells type. (Image 3)

In the one cell type we have identified different variants, in which it is interesting to analyze access to the stairs room: in some portions of the block it is inserted within the dimension of the cell, in other cases it takes the court for access.

Figure 3. The row house, declined into three variations: one cell type, bi-cellular type, three cells type. Redesign of the authors



When an half-cell, added inside the courtyard, houses stairs and services, leaving the whole cell directly overlooking the main street, such as the case of vicolo dello Struzzo.

In same cases the first floor and the second floor belong to a single apartment, *single-cell* two floors and in same cases one cell type is halved on the ground floor to provide access to the court.

Also for the double cell type, we identified variants with similar characteristics. Usually the row house has two openings, constituted by a pair of openings for side.

The openings of the ground floor allow direct access to the shop or to the stairs room that leads to the one-family house which, also in this case, developed on the two upper floors.

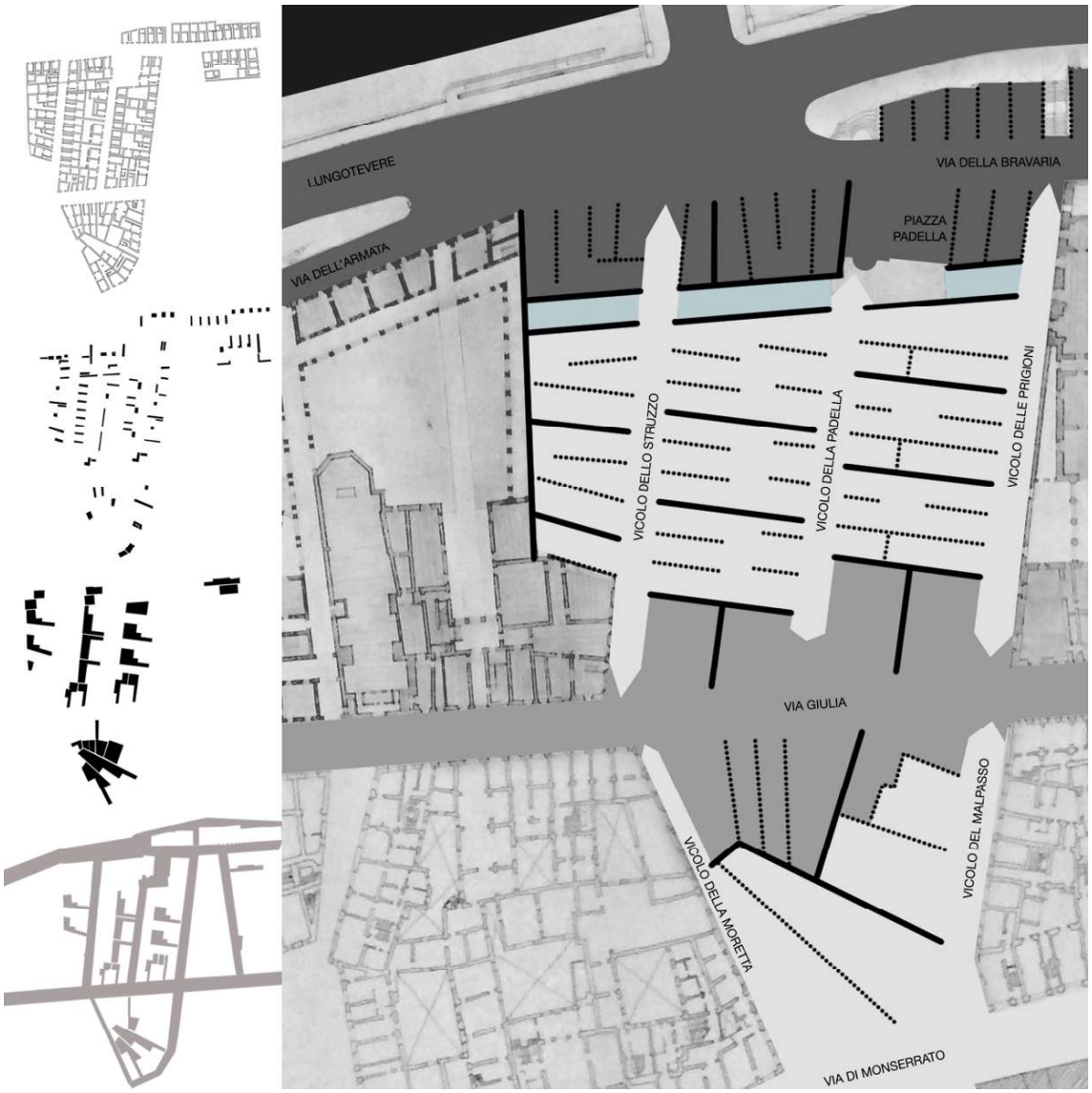
The internal distribution is given by the disposition of stairs room, that usually are arranged on a single ramp parallel to the depth of the element, in correspondence of the outermost cell.

Sometimes developed perpendicular to the direction of the cell and define different spatialities. In other cases, such as in the left side of vicolo della Padella, the stairs are out of the element, in the court, and the house is parallel to the street, not in depth, in one plan.

In the triple-cell type the element comprises on addictional floor than previous ones.

The two flights stairs is situated in the central cell, is shared by the three appatments that develop, each, on a plane, multiple family. Also here the double facing is consti-

Figure 4. Left: A division of the full project into layers: the permeability of the block, the open spaces of the courts and the distribution system of housing. Right: Relationship between building type and axes. Redesign of the authors



tuted by a pair of openings for side, but undergoes a variation in the back side: in this case, the openings are not found on the short side of the element, but on the long one, in correspondence of the inner court, interrupting the continuity of one of the two longitudinal walls.

After processing a graphic analysis for elements (Image 3), we have produced a division of the full project into layers that affect permeability of the block, the open spaces of the courts and the distribution system of housing. (Image 4)

Pedestrian access to the Lungotevere dei Sangallo is still directed by vicolo delle Prigioni, through the interruption of the linear fabric that entails replacing a rowhouse, which is the unit serial, with a staircase leading to the level of the Tiber and used to establish a continuous axial from the Tiber itself to Via del Pellegrino, passing Piazza della Moretta.

It is clear that the existence of an axial hierarchy orients planning and compositional choices. If this is clearer on Via della Bravaria, where every element is conditioned by the role of *path matrix* (Caniggia 1997) that takes away, instead on Via Giulia the rebuilding

of the continuous front is the result of a complex compromise between the will to relate to the permanent tissue of Piazza della Moretta and the chance to act, critically, in the modification of the typological process. (Image 4)

References

Aymonino, C. (1990) *Progettare Roma capitale*, Desideri, P. and Leoni, F. (ed.) (Laterza, Roma).
Caniggia, G. (1963) *Lettura di una citta: Como* (Centro studi di storia urbanistica, Roma).
Caniggia, G. (1997) *Ragionamenti di tipologia. Operatività della tipologia processuale in architettura,* Maffei, G. (ed.) (Alinea, Firenze).
Caniggia, G. and Maffei, G. (2008) *Lettura dell'edilizia di base* (Alinea, Firenze).
Caniggia, G. and Maffei, G. (1979) *Composizione architettonica e tipologia edilizia* (Marsilio, Venezia).
D'Amato Guerrieri, C. and Strappa, G. (2003) 'Gianfranco Caniggia. Dalla lettura di Como all'interpretazione tipologica della città', Atti del Convegno Internazionale di Cernobbio, 5 luglio 2002, (Mario Adda, Bari).
Strappa, G. (2014) *L'architettura come processo: il mondo plastico murario in divenire* (Franco Angeli, Milano).

An organic method of village rehabilitation through a reconstruction archetype based on vernacular architecture

Kousuke Masuo
Alsed, 5F, 1-20-1, Shibuya, Shibuya-ku, Tokyo, Japan, 150-0002
Keywords: Yamakoshi region, Village, Disaster revival, Traditional houses, Housing reconstruction

Abstract

In Japan, industrialization has achieved the elimination of housing shortage. However, it resulted in the loss of local atmosphere and uniform landscape. Traditional houses are becoming extinct, while the local house production system is progressively getting weaker. Furthermore, Japan has faced a large number of disasters over the recent years, making disaster management an important aspect of the Japanese urban planning.

Yamakoshi region is an area that was stricken by the Chuetsu earthquake in 2004. The author of this paper has played a major role as part of this area`s reconstruction project team. Yamakoshi region is located in a semi-mountainous area and consists of several villages with wooden detached housing. The goal of this project was to create a reconstruction process based on the history, culture and climate of the area, through providing a reconstruction archetype based on the traditional private houses of the region.

The methodology for realizing this goal consisted in three steps. The first step was the research of the traditional houses` essential elements such as floor plans, architectural style, structural details, location requirements, interaction with the climate etc. The second step was the discussion and interview with local carpenters. The third step was the proposal of a reconstruction archetype based on the results of the research conducted previously, which has several variations, and the construction of two prototypes.

As a result of the project, various housing types based on these two prototypes were developed, and the reconstruction project team was able to support the rebuilding of many houses. With this project a new organic method of village reconstruction was presented, using a reconstruction archetype based on the history, culture and climate of an area. Currently, this method begins to spread as one of the methodologies for reconstruction of disaster stricken areas in Japan.

Introduction

The Yamakoshi region, part of Nagaoka City, in Niigata Prefecture (Japan) is located in a semi-mountainous area and consists of several villages characterized by wooden detached housing.

The 23rd October 2004, the area was seriously damaged by the Chuetsu earthquake. Among the 747 existing dwellings a 44% (328 buildings) were completely destroyed and the rest suffered severe damage, leaving no building intact. Main roads also were cut off, what caused the isolation of numerous villages. On that event, the whole Yamakoshi region had to be evacuated and all local residents moved to the city center of the neighboring of Nagaoka city (figure.1).

Immediately after the earthquake, local government set up a reconstruction plan with the objective of allowing as many residents as possible return to Yamakoshi. At that time, although many residents wanted to return to their previous familiar villages, there were many difficulties on housing reconstruction, specially for the high number of elderly people. What is more, even if local administration chose to invest on public housing construction in the gradually depopulating mountainous areas, the problem of the many future vacant houses would remain unsolved.

In this, a special action committee composed by relevant governmental agencies (Nagaoka City, provincial and national agencies), academic experts, local workers and experts from the construction sector was launched. The committee decided to focus on the return to the mountainous areas of the highest possible number of victims and on the possibility of self-reconstruction of the damaged buildings by the victims on their own. Thus, it was decided to develop a reconstruction archetype, about one million yen worth, adapted to heavy snow and respectful to the life in Yamakoshi.

The author of this paper, who was an architect commissioned by Nagaoka City, played a major role in the creation of this archetype.

Reconstruction archetype development process

The harsh conditions during the winter in the Yamakoshi area, one of the regions with the heaviest snow falls in Japan, did not allow the reconstruction committee start its activities until six months after the disaster, which had occurred just at the threshold of the snow season (figure.2).

In order to develop the reconstruction archetypes, it was first needed to understand the local village landscape and building features of the site. On that purpose, the work group first studied the *fuudo*[1]mesology (climate and natural features in connexion to the history of local people) and local minka country houses, then carried out research on damage and villages in the 14 settlements of the Yamakoshi area and besides, completed the research with the study of the houses that escaped the disaster. After the research followed a period of consultation with local carpenters and wood suppliers from the region, which based mainly on photo survey and analysis of documents. The discussion was developped through six meetings with diverse topics: 1. first meeting 2. variations in floor plans 3. snow counter-measures 4. local life style 5. housing supply and 6. costs of the reconstruction arechetype. At the same time, the study was completed with field survey as well as feedback from consultation with the homebuilders.

[1]"Fuudo is a living thing. Fuudo is not only an object--in other words, land and climate--but Fuudo is also the history of people who live in it. People joined with other living creatures have historically created Fuudo. Therefore we cannot separate historicity when considering Fuudo. Fuudo and historicity interacting with each other move historically in a certain direction. In which direction they move is significant for people. I say "for people" because Fuudo is a complex that combines technical systems and symbolism that people have created and kept alive within the ecological systems, and that complex is alive.", (on respectful reconstruction after the 2011 tsunami) A. Berque, Rebuilding Japan's Fuudo (natural environment with cultural background)--Reconstruction from the Great East Japan Earthquake considered from the viewpoint of Fuudo, Japan Foundation symposium, 11 October 2011

The results of this six-month research process were summarized and presented then in a symposium, directed to local people mainly ,that took place one year after the earthquake (figure.3).

The concept of "reconstruction archetype"

The reconstruction archetype was designed according to four main concepts: 1. Suitability for the Yamakoshi area 2. Adaptation to heavy snowfalls 3. Creation of a sustainable regional system 4.Reduction of costs for the disaster victims.

Yamakoshi-like suitable dwelling

The design of traditional houses in Yamakoshi is characterized by what is called "Chuumon-dzukuri". This means, a L-shaped perpendicular layout house with *tsumairi* style *genkan* (entrance hall) on the short side (the entrance to the house is on one of the gable ends of the roof so that the approach is made parallel to the ridge). In the past, the horses were kept in the vicinity of this entrance. This design is adapted to seasons when snow accumulates considerably and helps keep clear the entrance alley.

This characteristic design, in order to preserve the house from snow, is defined by a robust roof to support the weight of the piled snow, clapboard affixed until near the eaves of the roof and a *shinkabe* entrance wall (wall with exposed wooden pillars) half timbered- half covered by stucco (figure.4).

In the reconstruction archetype, this characteristic entrance was preserved, as representative of the landscape in Yamakoshi.

An adapted design to deal with heavy snowfalls

One of the goals of the reconstruction archetype was to cope with an accumulation of snow of 3m, the average estimate during the last 20 years. The deisgn adopted a roof typology which, without any mechanical snow removal, allows accumulated snow fall naturally. The construction and maintainance costs of this type are relatively low and moreover, the shape adapts perfectly to the regional landscape (figure.5).

In case of a 3m snowfall, a roof typology of 7,28m wide between supports, which also allows natural accumulated snow fall naturally, would let snow pile up to 5.13m on the sides of the house. For that reason, in order that the amount of snow cannot break the eaves of the roof, a sufficient hight of about 6m from ground level to the eave was saved (figure.6). At the same time, the ridge of the roof was oriented N-S, so as not to drop the snow on the access to the house, and thus allowing lighting from a high window , which, connected to a double height space, ensures illummination to the rear of the first floor. In addition, in order to keep snow far from the outer wall, the gable ends are prolonged in firm cantilevers.

Last but not least, as an area of 3m from the edges of the roof must be secured for accumulated snow, the creation of neighboring land boundary rules was also considered, for example, establishing the boundaries at a distance of 4m to allow the access to heavy equipment for snow removal in case of emergency.

According to floor height, two different models were suggested for the archetypes. The first one is the "raised floor model". In the Chuetsu region, it is popular to build the ground floor in reinforced concrete, in order to resist the heavy snowfalls, leaving an empty ground floor that can be used as a garage. However, this type of construction, leaves out the traditional visual merits and is not barrier-free as it requires the addition of exterior stairs which can entail high risks for the users.

Therefore, the archetype proposed the addition of a summer *chanoma* (social living-room) on the ground floor, emphasizing in such way everyday social relations of the community.

The second model is the "low floor model". This type uses the ground floor as a space for farming tools and related activities as well as relations with neighbours. This space is

【Figure.1】

colapsed houses

disruption of roads

building fell into cliff

disaster percentage

【Figure.2】

summer in Yamakoshi

winter in Yamakoshi

【Figure.4】

traditional Chuumon-Dzukuri house

new Chuumon-dzukuri-like house

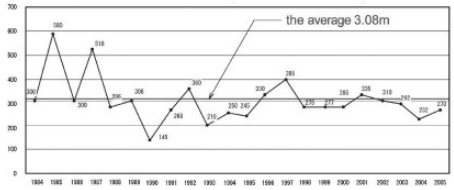
【Figure.3】

Yamakoshi future image by reconstruction archetypes
published at the local symposium

committee discussion

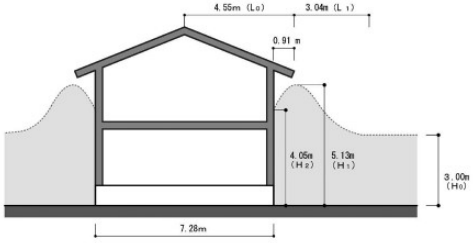
discussion with carpenters

【Figure.5】



The average of the deepest snowfall of the past 20 years of Yamakoshi region was 3.08m. The average snow cover period was 120 days, which corresponds to 1/3 of 1 year. Reconstruction archetype was to cope with an accumulation of snow of 3m.

【Figure.6】



In case of a 3m snowfall ,the frontage 7280m,would let snow pile up to 5.13m on the sides of the house. For that reason, in order that the amount of snow cannot break the eaves of the roof, a sufficient hight of about 6m from ground level to the eave was saved.

【Figure.8】

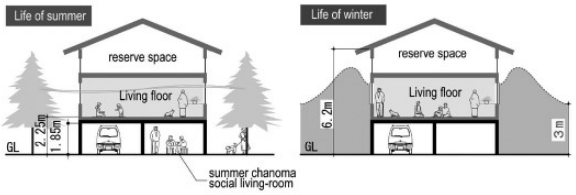
house construction with local wood

【Figure.9】

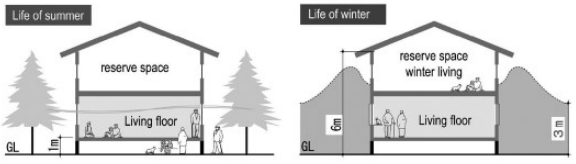
image of the unfinished floor

【Figure.7】

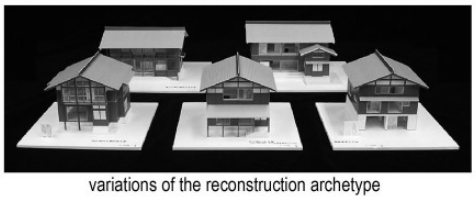
【raised floor model】



【low floor model】



【Figure.10】



variations of the reconstruction archetype

1460

built on a reinforced platform of 1m from ground level and can receive light from the windows of the second floor even when buried in snow (figure.7).

In accordance to the local natural conditions of Yamakoshi, which is isolated by snow half of the year, it was important to design houses that could retain as much light as possible throughout the long winter. For this reason, in order to get light from the second floor windows of the main facade the double height space was created. On the other hand, as summers are very humid, the design aimed to take advantage of the street breeze as well by adopting sliding doors. Besides, solar radiation could also be shielded by the previously mentioned cantilever eaves, thus, having a double function of protection from snow and solar radiation. However, just a house with a double space cannot fulfill all of the needs of the Yamakoshi area lifestyle, and so the design was completed with a central FF stove, sufficient insulation and air leakage efficiency in order to keep the house warm during the winter.

We have organized a variety of ideas for the heavy snowfall in the manner described above (figure.11).

Life according to the sustainable regional system

The reconstruction archetype, in order to mitigate the environmental impact and reactivate local industries, made use of local materials for the construction, specially the Echigo cedar (*Echigo-sugi*) (figure.8).

In adition, for the construction of the outer walls new industrial materials were not either employed; Echigo cedar clapboard was used instead. The use of this material, which could become a sustainable industry for the future of the region, facilitates partial repairs of damaged parts and creates an harmonious local atmosphere. Also, from the viewpoint of maintenance of the houses and inheritance of caperter skills, the construction of the model made use of local carpenters, which used the conventional shaft assembly construction method, deeply rooted in the region.

A house which can reduce the cost burden for disaster victims

The project tryed to reduce the construction costs by using standardized materials, construction methods and equipment, by grouping the work in bigger lots or unified actions, by cooperating with regional homebuilders, by coming to special agreements on the price of reconstruction material with producers and by using diverse administrative support.

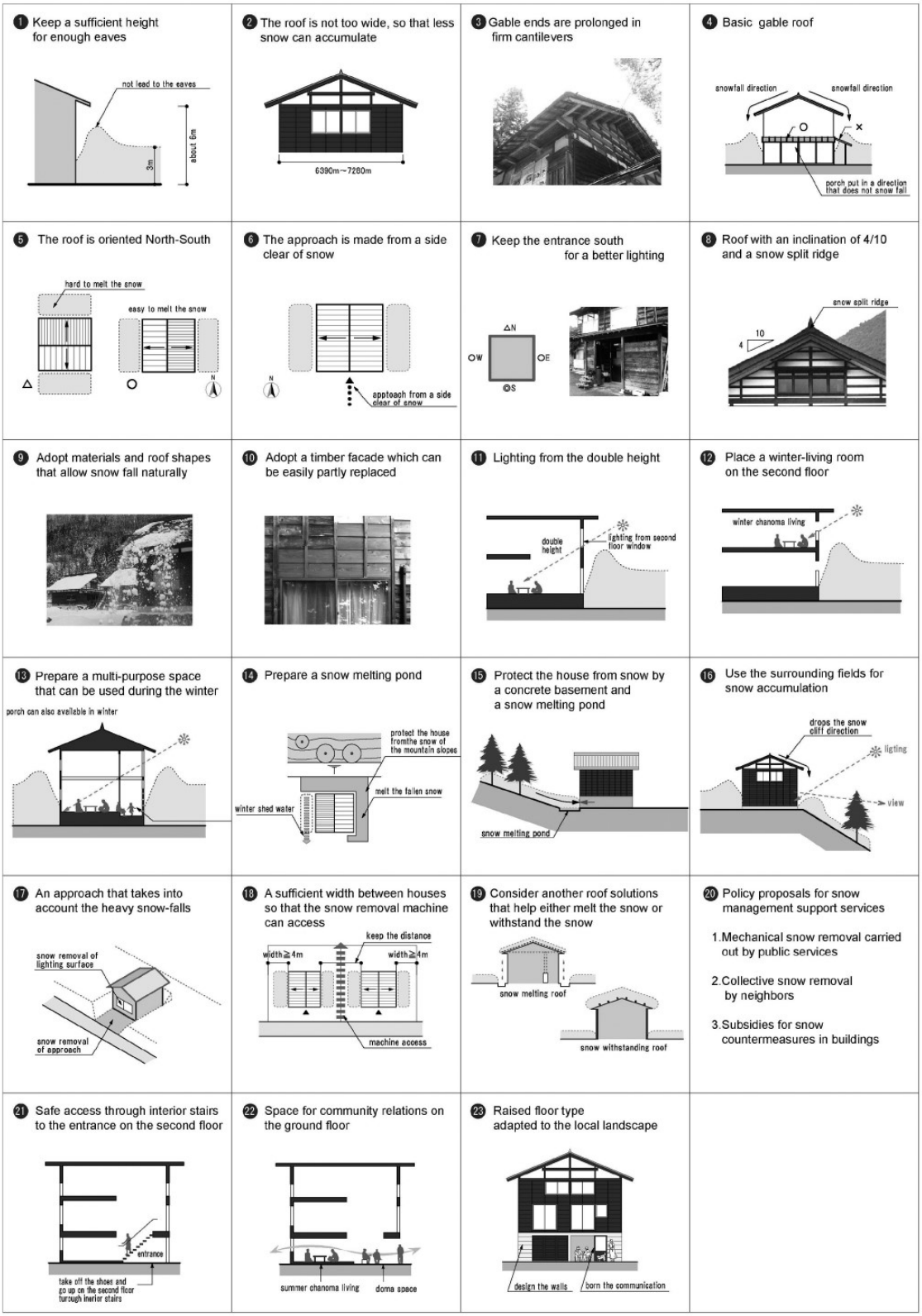
Furthermore, the proposed archetype allows not only an immediate response to dwelling reconstruction problems, but also a fast low-cost housing model that local carpenters could develop throughout the region even after the completion of post-disaster reconstruction programs (figure.9).

Variations of the reconstruction archetypes

Five different archetype variations based on the previously described characteristics were created: low-floor basic model (A), raised-floor basic model (B), low-floor with sunroom model (C), low-floor with porch model (D) and low-floor *chuumon-dzukuri* style model (E). From these variations, the low-floor basic model (A) and the raised-floor basic model (B) aim to reach a low-cost of 10 million yen. The most basic model takes the example of two retired persons as a familiar unit, and defines a 9240m wide 9240m depth square plan living space. Furthermore, this basic model is designed so that it can meet the needs of different familiar units. For example, a model with an added sunroom (model C), a model which facilitates the life of the elderly featuring an exterior *doma*[2]

[2]doma: refers to a domestic transition space between the exterior and the interior of a house, located normally at the entrance ,and which is can be differenciated from the noble areas of a house by the different height (lack of elevated flooring) or the use of a different flooring material

【Figure.11】


1 Keep a sufficient height for enough eaves
not lead to the eaves
about 6m
3m
2 The roof is not too wide, so that less snow can accumulate
6390m~7280m
3 Gable ends are prolonged in firm cantilevers
4 Basic gable roof
snowfall direction
snowfall direction
porch put in a direction that does not snow fall
5 The roof is oriented North-South
hard to melt the snow
easy to melt the snow
6 The approach is made from a side clear of snow
apptoach from a side clear of snow
7 Keep the entrance south for a better lighting
8 Roof with an inclination of 4/10 and a snow split ridge
snow split ridge
10
4
9 Adopt materials and roof shapes that allow snow fall naturally
10 Adopt a timber facade which can be easily partly replaced
11 Lighting from the double height
double height
lighting from second floor window
12 Place a winter-living room on the second floor
winter chanoma living
13 Prepare a multi-purpose space that can be used during the winter
porch can also available in winter
14 Prepare a snow melting pond
protect the house fromthe snow of the mountain slopes
melt the fallen snow
winter shed water
15 Protect the house from snow by a concrete basement and a snow melting pond
snow melting pond
16 Use the surrounding fields for snow accumulation
drops the snow cliff direction
ligting
view
17 An approach that takes into account the heavy snow-falls
snow removal of lighting surface
snow removal of approach
18 A sufficient width between houses so that the snow removal machine can access
keep the distance
width≧4m
width≧4m
machine access
19 Consider another roof solutions that help either melt the snow or withstand the snow
snow melting roof
snow withstanding roof
20 Policy proposals for snow management support services
1.Mechanical snow removal carried out by public services
2.Collective snow removal by neighbors
3.Subsidies for snow countermeasures in buildings
21 Safe access through interior stairs to the entrance on the second floor
entrance
take off the shoes and go up on the second floor turough inwior stairs
22 Space for community relations on the ground floor
summer chanoma living
doma space
23 Raised floor type adapted to the local landscape
design the walls
born the communication

support space facing the engawa veranda (inside-outside transition space) (model D), a model based in the vernacular *chuumon-dzukuri minka* country house (model E) compose the variations in scale and use of the minimal model. After about one year after the earthquake and in order to actualise the reconstruction archetypes, the development image for the Yamakoshi region, models of the different archetype variations and documents explaining the diverse archetype lifestyles were shared with the affected residents (figure.10-12).

Promotion of the reconstruction archetypes

In the event of reconstruction carried out within a limited period of time after the dissaster, it is necessary to efficiently supply for a large number of houses at a reasonable cost. After consultation with local residents about one year after the dissaster, and in order to promote the construction of the archetypes, the stablishment of a common reference framework was pushed forward. Many different topics arose: 1. creation of the unified design guidelines 2. contents of consultation to the victims 3. creation of the construction support system and 4. the construction of a model house.

Creation of the unified design guidelines

With the objective of unifiying the efforts of the many diverse architects involved in the reconstruction process under the same objectives and design lines, a guide for house building, documents presenting the standarized design, rules for construction and a construction cost estimation system among others were established. This system eases the work of support architects who, by submiting just a minimun amount of plans for obtaining the construction licenses, can rapidly develop similar designs to the reconstruction archetypes.

The contents of consultation to the victims

Through general briefings addressed to the whole population of the Yamakoshi region and specific briefings for each village, reconstruction archetype initiatives were introduced and people who wanted to rebuild their homes using the proposed archetypes were spoted. A list and chart of the interested people were created and then, consultation on building design to the support architects was carried out and connected with the advice on the construction process by support builders in the construction support system.

The construction support system

The construction of the archetypes was supported by the creation two groups: the organization of volunteer builders and the design support organization. The first team was formed from the cooperation of the Yamakoshi region carpenters community and the building cooperatives from Nagaoka city. The second group integrated by awared architects from Nagaoka city and the support committee (figure.13).

The construction of two model houses

In order to facilitate a look to the reconstruction archetypes by the independent rebuilders, two prototypes were constrcuted: low-floor basic model and raised-floor basic model. The prototypes aimed to serve as a housing example, not only for the victims, but also for carpenters and builders (figure.14)

【Figure.12】


(A) Low-floor basic model
Tatami room
rest room
Bath room
Wash room
LDK
Entrance
Free space
Winter chanoma living
(B) Raised-floor basic model
Summer chanoma living
Entrance Doma
Tatami room
rest room
Bath room
Wash room
LDK
Free space
(C) Low-floor with sunroom model
Bath room
Wash room
rest room
Store room
Tatami room
LDK
Entrance Doma
Free space
Winter chanoma living
Sunroom
(D) Low-floor with porch model
Tatami room
Wash room
Bath room
rest room
LDK
Entrance
Porch
Free space
Winter chanoma living
(E) Low-floor Chuumon-Dzukuri style model
Tatami room
rest room
Wash room
Bath room
Tatami room
LDK
Engawa Veranda
Entrance Doma
Bedroom
rest room
Store room
Bedroom
Bedroom
Sunroom

The finantial planning for the reconstruction archetype

Two experimental reconstruction archetype prototypes were built trying to keep the desired low-cost budget of 10 million yen. The final construction costs were as follows: 12.5 millions for low-floor basic with a total area of 90m2 and, 13.5 million yen for the raised floor basic model of 140m2.

In order to support the victims afford the costs of the housing reconstruction, Niigata Prefecture granted the earthquake victims with 1 million yen for resettlement and 1.8 million yen for reconstruction, making a total of 2.8 million yen. The amount of the grants from the reconstruction fund depended on criteria such as the type of reconstruction archetype, the measures adopted to deal with snow, the use of local limber in the reconstruction, landscape consideration and the integration of measures such as barrier-free solutions in the design.

The minimal model of reconstruction archetype, was developed considering a self-financing cost on the part of the victim of 10 million yen, plus the amount granted by the Niigata prefecture aid fund. In addition to the grants from the government, donations from all over the country reached 4.59 million yen for each household of the Yamakoshi area. With the help of these donations, self-contribution by the victims reduced to 5.11 million yen for low-floor basic models and, 6.11 million yen for raised floor basic models. In adition, in the Yamakoshi area, people who were affiliated to the Agricultural Cooperative earthquake insurance, were granted with 5 million yen each, thus also alleviating the amount that was due to be payed by the victims themselves (figure.15).

Coordination with public housing systems

In cases when independent reconstruction was particularly difficult, post-disaster public housing was provided. Based on the considerations of the reconstruction committee, the public housing system of the Yamakoshi area carried out a series of support actions in each village, such as helping return to the familiar villages for families that had to move out after the earthquake and facilitating continuity in the area, in order that the regeneration of the village functions were smoothly undertaken. Moreover, public housing followed also the methodology and design developed for reconstruction archetypes, taking into account that those public dwellings could become a future housing stock in balance with the regional character.

Three types of public housing were developed: detached type (F), semi-detached type (G), low-floor *nagaya* row houses type (H). Being concerned about the need for balance with the independent renovations, the shapes of the housing complexes were designed according to the renovation archetype principles too.

As the villages were not expecting many incoming residents, the construction of public housing aimed to create a future detached housing stock for sell (examples of detached public housing in Japan at that time were quite rare). Also, the semi-detached type was prepared to be converted into detached houses and rural *minshuku* farm-houses, in order to be able to correspond to the future diversification of uses (such as group homes) by the use of removable partition walls, designed not to be fixed (e.g. antiseismic walls).

Variations and the capacity of housing supply by means of the reconstruction archetype

On the third year after the earthquake, the purpose for the Yamakoshi region before the end of 2008 was to carry out, according to the reconstruction archetypes, the reconstruction of two archetype prototypes, the completion of 18 independent reconstruction units, the construction of 35 public housing units and the conclusion of 55 Yamakoshi style-like units for those people who had taken refuge in Nagaoka city.

At that time, 470 households, out of a total of 690, had returned to their origin villages in the Yamakoshi area; this means a 68%. Among the 470 household that returned to their villages, 99 households rebuilt a new house(21%), 35 households moved to public houses (7%) and 336 households old house renovation (72%).

【Figure.13】

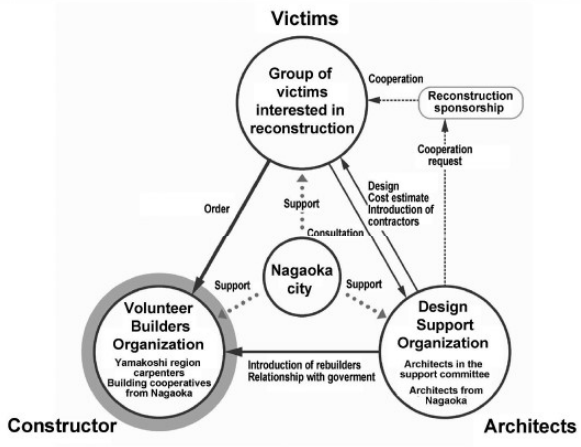
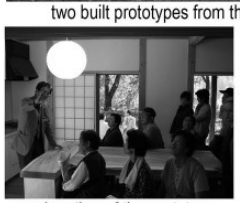


diagram of the support system

【Figure.14】

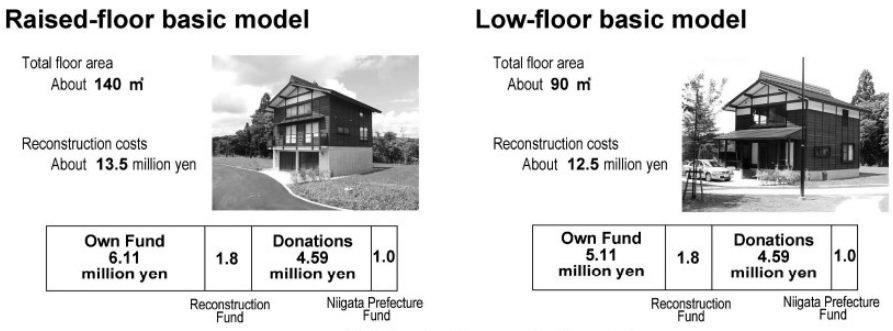
two built prototypes from the reconstruction archetype



explanation of the prototype

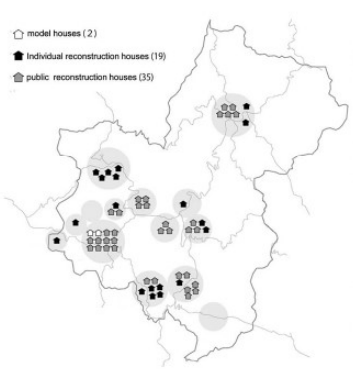
visit to the prototype house

【Figure.15】



detailed costs of the reconstruction archetype

【Figure.16】



results of the reconstruction supply projects

A. low-floor basic model (5)

B. raised-floor basic model(13)

E. low-floor chuumon-dzukuri (1)

F. detached type (4)

G. semi-detached type (24)

H. low-floor nagaya row houses(7)

【Figure.17】

2004.10.23
The Chuetsu earthquake
Yamakoshi region
reconstruction archetypes

2007.3.25
The Noto peninsula earthquake
Ishikawa prefecture
reconstruction archetypes

2011.3.11
The Great East Japan Earthquake
Ishinomaki (Miyagi prefecture)
reconstruction archetypes

2011. 9. 1
The floods in the Kii peninsula
Totsukawa (Nara prefecture)
reconstruction archetypes

1466

From the 134 new constructions that were develpoed, 41% followed the lines set by the reconstruction archetype and were rebuilt by the local construction support system. The mentioned examples are the most significant case but, however, the system had a ripple effect and partial elements of the reconstruction archetypes were used in many other renovation projects.

Individual reconstruction projects based on three types of archetype and made new variations. 5 units derived from the low-floor basic model (A), 13 units from the raised-floor basic model (B) and one from modl E. On the other hand, for public housing projects, 4 units were built from modifications on the single-family type (F), 24 units from two unit-one type (G), 7 units from the low-floor *nagaya* type (H) (figure.16).

Conclusion

After the Chuetsu earthquake in October 2004, many other earthquakes, tsunami and floods were frequent in Japan: the Noto peninsula earthquake (Ishikawa prefecture) in March 2007, the Niigata Chuetsu-Oki earthquake in July 2007, the Great East Japan Earthquake from March 2011, the floods in the Kii peninsula in September 2011, etc. (figure.17).

The reconstruction strategy presented in this paper, which based on traditional house study and organic regeneration of villages through archetype application, proved to contribute to the regenerationof local landscapes, aid the reproduction of the life and livelihood in the region and preserve the regional housing production system for future generations. Besides,as this action process can be adapted to diverse disaster areas, the system has begun to spread as an effective methodology for reconstruction.

References

Takeda, K. (2008) 'Reconstruction housing models for earthquake damaged areas in Yamakoshi(no.1) ' (Alsed).
Masuo, K. (2008) 'Reconstruction housing models for earthquake damaged areas in Yamakoshi(no.2) ' (Alsed).
Takeda, K.and Masuo, K. (2012) 'From Yamakoshi to the great east Japan earthquake' (quarterly machizukuri 32).

The Conceptual basis of the Italian School of Urban Morphology and its application to a case study in Brazil

Staël de Alvarenga Pereira Costa, Maria Cristina Villefort Teixeira, Marieta Cardoso Maciel, Maria Manoela Gimmler Netto
Escola de Arquitetura da Universidade Federal de Minas Gerais.
Rua Paraíba 697, sala 404C. CEP: 30130-140. Belo Horizonte, Minas Gerais, Brazil.
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Abstract

This paper focuses on the conceptual basis of the Italian School of Urban Morphology and its application in other countries, in this case, Brazil. The use of the morphological-type concept, as applied to the Brazilian historical town of Ouro Preto, classified as a world heritage site by UNESCO, will form the centre of analysis. In order to assimilate concepts we sought secondary sources, contained in books, papers and presentations from the leading representatives of the schools given at scientific events related to the field. Other methods used to enhance the understanding of the concepts led to the use of methodological strategies such as, discussion groups and internal seminars composed of faculty members and research students. The research was carried out on Ouro Preto's original axis of urbanization known as 'o caminho tronco' (the trunk road). All concepts related to the four main categories - basic types, their derivations, the identification of basic types in series, the main axis, nodes, pole and the basic formation of the urban fabric, were identified in the city. It was found that, in relation to the issue of territory, aspects of the city´s structure did not prove similar to those reported in the Italian case. On the other hand, the results confirmed that the Italian concepts can be applied to different realities to that of the original and have also proven useful tools for the analysis of historical cities in providing guidelines on public policy evaluation and cultural preservation.

Introduction: The historical background

The text uses the lectures and testimonies of Italian architects and former disciples of Muratori to present the concepts of the school to scholars from different academic backgrounds who are unfamiliar with his ideas. Caniggia and Maffei (2001) further help in the understanding of concepts, together with, the lectures presented by the disciples of Muratori, Cataldi, Maffei, Marzot, Strappa and Vaccaro at the International Seminar on Urban Form (ISUF/ 2007), held in Ouro Preto.

At the seminar the disciples stated that they had made an attempt to synthesise theories, in order to, provide the key to the conceptual system which they considered difficult for non-Italian scholars to understand. Thus, they sought, not only to increase the number of potential followers, but also to highlight the systemic contradictions and the complex issues for which solutions could contribute towards future fruitful developments.

The basis of the Italian school of urban morphology

Four sequential dialectical expressions were considered central to establishing the theoretical framework. The study method had as its point of departure an analysis of the particular to the general, thus the four successive dimensional scales deal with buildings, urban fabric, towns and territories. Each of these items are emphasized at every step up the scale in question. Furthermore, each scale of expression consists of a series of dual concepts that are dialectical and provide continuous exchange between both the theoretical and the physical subjects, which in turn, tend to be progressively modified, one by the other.

For Muratori (1960), an architectural language is the central concept for which he used the metaphor of the human body as a thinking referenced object (the architect) and the designed object (the building), both of which constitute the common denominators. The relationship between the subject - man (as consciousness) and the object - nature, is deemed to be at the root of everything. This reciprocal exchange occurs between two apparently very different worlds: the mental and the real. The mental world for architects refers to the greatest instrument of action - the project and to its particular nature - the concept, which usually precedes the new product. The project, thus modifies nature. This is even more important for architects because it is assumed that the project represents a type that is always born from the mind of a designer.

However, for Muratori, the advent of modern architecture brought separation between structure and form and thus adversely influenced the views of professionals. This resulted in the quantitative and simplified reproduction of new materials used in standardized buildings, constructed in series and without commitment to the local tradition. In reaction to this tendency, Muratori introduced the concept of the formal unity of cohesive structures that change over time. Consideration of the process of change, inherent in traditional buildings, became pivotal and included reflections on the formative and transformative processes that have been reflected in historical research and Italian urban planning. From these ideas he conceived the instruments that have become acknowledged as the methods adopted by the Italian school of urban morphology and which became the object of analysis and practise in this case study of Ouro Preto.

The strategies for understanding the concepts of the Italian School of Urban Morphology

In September and October 2013, the Landscape Laboratory at EAUFMG held a seminar to discuss the methodological procedures of the Italian School. The objective was to discuss and study the chapters of the book, "Interpreting Basic Buildings" (Caniggia et Maffei 2001), so as to further develop the instruments which would be subsequently applied to a specific study of Ouro Preto / MG. The subjects were divided into six sessions, according to the topics contained in the second part of the book, the latter containing the precepts for the differing levels of analysis. These were progressively widened so as to accommodate that which is recommended in the method.

The concepts and discussions

During the first seminar it became strikingly apparent that the concepts "spontaneous awareness" and "critical consciousness" constituted the issues most discussed in the debates. Participants questioned the terms and the concepts as they understood that consciousness requires the development of critical thinking, thus highlighting a basic conceptual contradiction.

In the search for information that could corroborate the concepts, it was noted that, according to Ferreira, (1993) consciousness can be considered as both a mental quality that belongs to the sphere of the human psyche and an attribute of the spirit. Awareness can also be synonymous with knowledge, a sense of what is happening within us and a more or less clear perception of phenomena that are related to our own existence. Finally, it was agreed that spontaneous consciousness is the result of an evolutionary process, inherited by cultural conditioning, acquired through trial and error and accessed from the unconscious in an automated way.

On the other hand, critical consciousness was deemed to represent rational development, leading to the consolidation of knowledge, embedded in the consciousness, which in turn becomes automated and spontaneous. Decision making was thus considered to be the clear result of critical consciousness.

The method

The Italian School develops its method by using, as its point of departure, an isolated element and then expands it into a general concept - the territory, consisting of the development of the urban element in four successive stages. The first stage is then to investigate the building type, the variation of the typological process and its successive transformations, while the second serves to identify the series which occur in the form of organic and serial combinations. The series are located along paths that respectively connect to opposite nodes and that, in turn, will subdivide into series to form aggregates with similar characteristics that form the urban fabric. The urban fabric consequently arises from the structure of routes that are progressively deployed towards the top to the bottom of the valleys.

The following figure shows the scales stipulated by the Italian School using a panoramic view of Ouro Preto to illustrate how the different scales will be presented.

The conceptual basis of the Italian School and its application in Ouro Preto

All concepts related to the four main topics, previously mentioned in the sections above, were identified in the city. Some concepts are easier to identify and therefore it is possible to highlight the basic type, urban fabric and territorial structuring.

The interpretation of building structures.

The traditional morphological analysis is structured on the type definition and is referred to as the interpretation of the building type. This distinguishes it as the residential building model that best represents the most common residence of a given culture. Another type that should be identified is the specialized, which includes, non-residential buildings consisting of larger structures that accommodate bodies, such as institutions. The authors suggest addressing the problem using a two-stage approach the first task being to allocate residential or non residential status to buildings.

Ouro Preto´s urban structure is characterised by the presence of buildings which mainly consist of basic and specialized types, many of which are of a religious or governmental nature, strategically located on the most visible parts of the landscape. The buildings manifest baroque and eclectic styles in keeping with their Portuguese influence.

The basic type definition and its derivations in Ouro Preto

The basic type present in Ouro Preto was presented by Sylvio de Vasconcellos in his book, Villa Rica (1977). In this work the author introduced the dynamics of the facades which manifest the existing diachronic transformation of the time. Further interpretations were made in 2013. (Pereira Costa et al, 2013). Ouro Preto´s basic type arose in the period between 1800-1850 and has a 5 metre wide facade with openings composed of two continuous windows and a door on the ground floor. On the upper floor there are three windows with small individual varandas (these often subsequently became interconnected).

Variations and the typological process

To Caniggia and Maffei (2001), each time period gives a different meaning to the basic type. This does not, however, lead to the emergence of a new concept, but rather establishes a continuity easily perceived within the buildings and referred to as variations.

A variation, is defined as encompassing a wide range of transformations that develop over time in relation to the basic type, updates being incorporated so as to meet new specific needs. (Marzot, 2001). Transformations in types are due to the cultural and historical processes of the places they belong and these consist of diachronic, synchronous, diatopic and syntropic variations, all of which have been identified in Ouro Preto.

Variations in the typological process in Ouro Preto

The transformations in the typological process were mapped out on a detailed survey undertaken on the main existing building types along the "trunk road". The variation that is most evident is the diachronic, also identified by Vasconcellos (ibid, id), whose description covers the entire transformative sequence from the foundation of the city until the 1960s. Vasconcellos establishes three major time cycles which occur in six diachronic variations: the periods 1700-1750 and 1750-1800, two variations that occur in the period 1800 to 1850, another between 1850 to 1900 and the third period containing three changes from 1900 onwards.

Synchronic variations

Synchronic variations are represented by buildings inserted at a later stage into spaces between two original buildings. The authors define these as consisting of adaptations which are inserted, with adjustments, into the basic type and that attend the requirements of the existing urban fabric.

Field work revealed reduced examples such as constructions found in vacant areas and with adjustments to the pre-existing building type. Another example found was observed on the facade which exhibited a small juxtaposition in the roofs - a significant adjustment when compared with the site plans. The construction of extensions to the basic type, inserted to facilitate adjustments to routes/roads, could also be observed. In this latter example the adjustment to the building was made so as to incorporate a new pathway located on the right side of the building type. It suggests that the narrow front needed to be adjusted to the new uphill pathway. The fourth example observed was the inclusion of a "step" and its apparent harmony with the basic type being that it hosted and adjusted to the curvature of the street in order to provide continuity.

The diatopic variations in Ouro Preto

Diatopical variation on the typological method comprises the changes found in different areas to the existing historical processes in these building types and in the areas where they are manifest. There are two examples along the trunk road in Ouro Preto that are illustrative of this phenomena. The first basic type, with just two windows and a door, is characteristic of the previously mentioned second period and is found in the Antônio Dias neighbourhood. This type epitomized the ideal for the residents of the era, the 'Paulistas',

the pioneers and exploiters of ethnic Indians and minerals whose permanent dwelling was in São Paulo. Thus, their residences, in the Antonio Dias neighbourhood, consisted of little developed, temporary housing which would be later discarded during subsequent economic decline and in the move to more attractive environs.

In the Pilar neighbourhood, in contrast, the predominant basic type, the manor, is characterised by having two floors and with a design typical of the second half of the nineteenth century. The area was occupied principally by Portuguese immigrants, their houses demonstrating through the architecture, status and site permanence. Pilar manifests the wealth of its residents and the careful maintenance of its Portuguese origins, thus representing a recreation of a Portuguese urban landscape in the tropics. Moreover, the meeting of the basic types, in different places, and their adjoining units, allows for an analysis that progresses according to the second stage of the Italian School, mentioned previously and referred to as a series.

The typological series

The second step in the method is related to the identification of series and consequently refers to an incipient junction of building types that adjoin over a parcel of land to form a reduced urban silhouette. Buildings assembled and aligned along a track form a complete series and represent the original form of urban organization. Objects of series components, even individually, are the result of aggregation and other parts of various elements that interconnect to form an urban organism, in which, each element is also an organism. These therefore form different series, depending on the higher or lower range of the function, which in turn, depends on a greater or lesser capacity for element fragmentation.

The Ouro Preto series

The most significant series in Ouro Preto represent a number of existing town houses next to the church of Santa Efigenia, in the Antônio Dias neighbourhood and the basic types found in Rosary Square in the Pilar area. The series are formed by elements of the buildings that comprise a set which the Italian school refers to as the "body". Every architectural period, and its series composition, is set in some basic elements of the previous period and reinterpreted for the period and these are established in the body, according to combinations and structured by means of the serial and organic visions.

The resulting combination of this junction will also vary in the same way, be it serial or organic. Four different combination possibilities thus create the character of the urban landscape and can be seen in the table below.

Table 1. Series combinations Source: GIMMLER NETTO, 2014.

COMBINATION / ELEMENT	SERIAL	ORGANIC
SERIAL	SERIAL-SERIAL	SERIAL- ORGANIC
ORGANIC	ORGANIC-SERIAL	ORGANIC- ORGANIC

The combination of serial elements in Ouro Preto

Along the trunk road, types of combination were identified, whilst other types lie outside the perimeter analysis. To display possible series combinations it was necessary to extend the observation scale so as to cover all the urban landscape. In spite of this aspect, all combinations were identified.

The organic combination with serial elements

The serial elements in an organic combination are represented by the series of basic types or urban houses that are deployed in a uniform way and repeated in an organic layout along the Ouro Preto trunk road.

The serial combination with serial elements

The serial elements in a serial combination are identified by a series of basic types in Tiradentes Square, comprising a public space built around a planned and terraced space and according to the Portuguese standards which were applied to the central squares of colonial cities of the era. (Delson, 1979).

The formative laws of the urban fabric

An analysis of the series revealed that these buildings were not constructed side by side by chance, but were subject to a regulatory system, inherent in the formation of a junction. These additions have taken place over time and therefore were constructed in harmony with the original common characteristics. The analysis of the series of buildings and the urban fabric take into account position on the urban scale, type boundaries and the block formation with such developments always following a defined route.

Routes and pertinent strips

Routes can be continuous linking points, such as, long distance axes connecting two urban centres. As connecting structures, they represent the first element of an urban core as their existence presupposes a need for the settlement of the subsequent pertinent strip. These strips are inherent to each alignment of roads that form plots accommodating houses.

Ouro Preto's main route and pertinent strips

Examples of pertinent strips in Ouro Preto include the sets built along the route matrix forming the trunk road and are, in the vast majority of cases, in alignment. The plots settled along the trunk road are occupied and have established boundaries and sometimes manifest adjustments between the two axes as can be found in synchronic variations. When routes are sectioned or cross they create nodes or poles that represent important functions for the urban body. Nodes are continuous, comprised of existing intersections and result from the development of crossroads, while a pole refers to the existence of several intersections and the congregation of activities that develop around it.

The nodalities and the pole in Ouro Preto

In the formation of Ouro Preto, after the consolidation of the small urban centres which developed in order to support mining activity, the Portuguese crown decided to ban human occupation adjacent to the mines. This decision led to the formation and consolidation of the two main centres, known as Ouro Preto and Antonio Dias, which intersect and represent the two main nodes.

Pole

For a considerable period of time, the connection between the two hamlets was precarious due to the topography and remained undeveloped for many decades. However, in 1741, the Governor's Palace was built there and the choice of this location enabled the joining of the two villages, the construction of Tiradentes Square and the consequent formation of new blocks and pathways. The square is an example of the accurate interpretation of the pole concept, whilst the constitution of node and pole

allows the institution of blocks and urban fabric due to the construction of planned and connecting routes.

Planned routes to buildings and connecting routes

In the theory, free spaces arising from the discontinuation of the buildings along the route matrix give rise to small cross roads that take the form of built axes. These new routes are nominated as planned routes. The connection route arises to the rear of the plot and thus provides access to the drives and consolidates the form of the blocks. On the main route, two planned streets give access to the buildings and at the end of the buildings a new route is created which connects the two. The formation of the block thus becomes the most important element of urban settlement.

Settlements, proto, urban core and urban centre.

On the last scale of analysis new concepts are used to focus on the existing complementary relations identified across the territory in general. As a summary of the settings, the authors describe the settlement as an isolated group of houses in a distant cluster or as a housing development. The proto-core consists of a town or urban nucleus which starts from a market centre and develops into a metropolis. In the final part related to concepts, the authors deal with territory.

Territorial bodies such as individualization of typical connections between routes, settlements, production areas and the urban organism.

The territory is considered to be the largest and most comprehensive part of the geographical space because it comprises the structures built by humans for accommodation and habitat. It is important to take these areas into account in order to understand how the existence of the settlements and urban areas occurred as a result of a previously structured production route. A territory consisting of routes corresponds to the civil nomadic phase, in which, groups of humans moved from one place to another without establishing territorial ties. It is only from the production stage that human settlements on the territory are able to emerge and the distinction of roles and the specialization of functions, lead to the exchange of products and the need for structures in market centres, located in the urban proto-core.

It is at this fourth territorial phase that the appearance of the initial stage of an incipient urban centre emerges. Subsequent developments are due to the progressive sequence of the territorial structure which from now on will be referred to as the system cycles. The first cycle refers to the occupation of the territory, the second defines the its consolidation, the third refers to the system recovery cycle and, the fourth, the restructuring, as discussed below.

The Human Occupation Cycle

The first cycle of human occupation is constituted by the implementation of the routes. The initial structure produced by human beings on the territory is a ridge route, the second a perpendicular route moving from the ridge towards the water springs, usually found on the hillside, and referred to as the "level of springs".

The venue for the settlement preferably has the morphology of a promontory, being that, it ends at the so-called secondary perpendicular route. Thus, the promontory protrudes beyond the territory that surrounds it - an essential prerequisite for establishing a settlement in which the human being recognizes the notion of territory and acquires a feeling of belonging.

The formation of several settlements, near the springs, induces the deployment of a new connecting route, located on the slopes and parallel to the ridge route. Adjacent settlements in the valley are also formed giving rise to another route linking the valley settlements and which run parallel to the river. As noted, the process of territorial oc-

cupation begins along the crest pathways, continuing from top to bottom and at all subsequent stages. In juxtaposition, the occupation process of consolidation starts, preferably at the valley bottom, where highway areas, production, settlements and, above all, urban centres emerge.

Second Cycle - The consolidation cycle of Human Occupation

Synthetically, an initial phase of consolidation is structured by the main roads on the valley floor which are used as rapid deployment routes, both local and regional. These repeat the role of the crest main roads, allow distant poles, are achieved quickly and facilitate the crossing of territories and the connection of main urban centres.

The Cycle of Recovery Systems

It appears that at this stage the crest routes, crest crossing routes, settlements, headlands and cities of the plain resume their development. In contrast, cities emerging from the valley bottom usually decline or deplete their resources.

The Restructuring Cycle

The fourth round begins with restructuring because the valley bottom structures are progressively reused for creating artificial plains with the consequent restoration of the valley's environment. We thus conclude with the territorial structuring cycles.

The territorial bodies: individualization of typical connections between routes, settlements, production areas and the urban organism in Ouro Preto

According to Castro (2013), the application of the concepts, from the perspective of territorial structure, should take into account local conditions, as is made evident in the study on the implementation of routes in Ouro Preto. This is further underlined by the observation that the frontiersmen and explorers sought ways to exploit the mines in the most efficient way. Routes that ran along the hillsides and the construction of the Strada Real, which connected the mining to marketing centres, facilitated such exploitation. Thus the route along the hillside settlements, as well as the Strada Real, were key determinants in the territorial structuring of Ouro Preto.

It is also possible to observe that the identification of the basic type and its diatopic variations can be considered subjects that are relatively easy to understand. They offer an immediate response to the educational exercise, in which, the study of concepts, related to urban fabric, often raises doubts and misunderstandings, such as those related to the boundary between two entities. Thus arises the realization that the identification of the basic type can best be performed during a field visit (as noted by Vasconcellos, 1956), while the identification and characterization of urban fabric requires a longer period of time to grasp because of the scale and the complexity involved.

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References

Caniggia, G. and Maffei, G. L. (2001) *Architectural Composition and Building Typology Interpreting Basic Building* (Alinea, Firenze).

Castro, C.M. (2013) *A análise da aplicação da teoria das rotas em Ouro Preto pela pesquisa Sincronicidade nas Escolas de Morfologia Urbana e seus paradigmas sociais.*

Banner apresentado na Semana de Iniciação Científica, da Escola de Arquitetura, Universidade Federal de Minas Gerais, Belo Horizonte, FUMP, PRPQ.
Cataldi, G. and Maffei, G.L. and Marzot, N. and Strappa, G. and Vaccaro, P. (2007) *The theoretical approach of the Muratorian school*. ISUF Ouro Preto Seminar 2007 - Reading of Ouro Preto.
Delson, R.M. (1979) *Novas vilas para o Brasil-Colônia: planejamento espacial e social no século XVIII* (Alva; CIORD, Brasília).
Ferreira, A. B. de H.(1993) *Minidicionário da Língua Portuguesa*. 3 ed. Nova Fronteira, Rio de Janeiro.
Marzot, N. (2001) Glossário Crítico In: CANIGGIA, G., MAFFEI, G,L,. *Interpreting Basic Building* (Alinea Editrice; Firenze).
Muratori, S. (1959) *Studi Per Una Operante Storia Urbana De Venezia* (Istituto Poligraphico dello Stato, Roma).
Pereira Costa, S.A. Gimmler Netto, M.M. (2015) *Fundamentos de Morfologia Urbana*. Editora C/ Arte (Belo Horizonte. no prelo).
Pereira Costa, S.A. et al. (2013) *The new conditions to answer old demands of the urban life*. International Seminar on Urban Form. Brisbane.
Vasconcellos, S. de. (1956) *Vila Rica: formação e desenvolvimento – residências* (Instituto Nacional do Livro, Rio de Janeiro).

Chair_Anna Irene Del Monaco
DiAP, Dipartimento di Architettura e Progetto, Facoltà di Architettura, Sapienza Università di Roma
Co-Chair_Marta Burrai
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

Urban Form and Theories
Urban Form and Meanings
Reading Urban Form
Urban Morphology Methods

Fringe Belt Analysis

Urban morphogenetic grain: extending fringe-belt research in China

Kai Gu, J. W. R. Whitehand and Susan M. Whitehand
School of Architecture and Planning, University of Auckland, Private Bag 92019, Auckland, New Zealand
School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham B15 2TT, UK.
School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham B15 2TT, UK.
Keywords: fringe belts, city walls, fixation lines, Nanjing, Pingyao

Abstract

The fringe-belt concept has until recently been largely uninvestigated in Eastern Asia. The findings of research on fringe belts in the Chinese cities of Nanjing and Pingyao are described in light of the findings of previous fringe-belt studies. The major fringe belts that have developed in these two cities have features characteristic of fringe belts in the West but there are associated aspects of morphogenetic structure that are different from those in the West and reflect the different cultural and political conditions in China.

Introduction

A key aspect of fringe-belt research is the light it can shed on the historico-geographical grain of urban areas. The way in which the long-term development of the physical form of cities has been characterized by phases of predominantly residential accretion separated by periods of little residential growth during which belts of generally lower intensity land use formed at the urban fringe has been demonstrated in a variety of different types of city. A concomitant of this process is that the zones of residential accretion separated from one another by a fringe belt generally have distinctive period characteristics.

Both the originator of the fringe-belt concept, Louis (1936), and the scholar most responsible for its development, M. R. G. Conzen (1960), gave considerable attention to the relationship between fringe belts and what Conzen termed 'fixation lines': strong, linear features, such as city walls, that exercised a long-term influence on the form of urban areas. In Berlin, Louis recognized the critical role that walls around the city had played in the development of the city's form. As in so many European cities, the fringe belts associated with those walls still differ markedly in a wide range of morphological attributes from the mainly residential zones that they separate, notably in their layout, physical texture and pattern of land use.

Since Louis's pioneering research, a succession of studies has affirmed the characteristics of fringe belts (see, for example, Barke, 1974; Whitehand and Morton, 2003). They tend to be coarse-grained in their ground plans, made up of plots that are larger, generally less regular in shape and less built-up than those in the residential zones that they separate. Fringe belts are significant historico-morphological markers within cities and by their major contribution to the historical grain of a city they are an aspect of its legibility and intelligibility: this has significant implications for planning, especially conservation (Whitehand, 2005).

The broad history of city walls in China has been the subject of numerous accounts. The construction of these walls has been part of the development of Chinese urban settlements as far back as 1500 BC if not earlier (Li et al., 2008). In addition to their defensive function, they gave protection from floods and provided shelter for rural people in times of civil disorder (Chang, 1970). The layout of Chinese cities has been heavily regulated throughout almost its entire history, and city walls were an integral part of this regulation (Chang, 1970). The significance of these walls is potentially greater than in other parts of the world because of their greater extent and longevity. However, fringe belts associated with city walls remain practically uninvestigated in China until recently.

There are major differences between China and Europe in the cartographic, documentary and archaeological information available for an enquiry into fringe belts. China has a long cartographical tradition, but true urban ground plans showing streets, plots and building block-plans, such as are available for much of Europe, were rare until very recent history. The maps available before the twentieth century contain sparse locational information and lack planimetric accuracy. Even in the early post-1949 period plots are absent in most urban plans. After the 1980s, true ground plans began to be prepared for a number of cities, and these are of particular importance for urban morphology. They provide the basis for detailed reconstruction of urban landscapes in conjunction with field surveys and other sources of information, including historical documentary records, photographs, paintings and web mapping services.

Fixation lines and fringe belts in Nanjing and Pingyao

Our project examines the projects for Via Paola, Via Giulia and Via della Lungara. These communicate with themselves for their *coherence of composition* which puts together (composes) the system of the historic city - strongly characterized by its residential use (in the East of the Tiber) - with the specialized buildings beyond the river.

The projects want to express the tendency of cities to change over time; the mutation is not a result of occasional events, but is the coherence between each building and the urban system.

The objective of the project is to reestablish an organic correlation with the new built

areas (Caniggia 1997) starting from the comprehension of the *hidden structure* of the City of the Past, so as to be able to individuate coherent and systematic design methods.

The Caniggia's analytical study proves that the area of Via Lungara (and Piazza della Rovere) is linked to a "radical change realized by the introduction of new only reversible infrastructures", particularly the Tiber; Via Giulia and Vicolo della Moretta's plans foresaw the connection between the Lungotevere dei Sangallo and Corso Vittorio Emanuele in continuity with Ponte Mazzini: "they are not some accepted plans and projects by the place, therefore never completed, and so punishable by the maximum reversibility" (Caniggia 1997). Then, there is an intermediate situation, the area of San Giovanni dei Fiorentini, where was planned the direct connection between Ponte Principe Amedeo and Corso Vittorio Emanuele.

The project attempts to reestablish the hierarchy of infrastructures within the project area. Corso Vittorio Emanuele remains the main infrastructure that connects the two banks of the Tiber.

The severed intersection with via Paola is reconsolidated, bringing it back to its former aspect, thus restoring the trident of roads and also allowing the facade of San Giovanni dei Fiorentini to act once again as the renaissance backdrop of the crossing.

The project suggests the homogeneous rebuilding of the street front of via Giulia; this front belongs to a solution that confronted with the gap between Via Giulia and the Tiber, especially in dialogue with the Ponte Principe Amedeo and with the tunnel (now Galleria Principe Amedeo). *The awkward presence of the Lungotevere* (Caniggia 1997) is overcome with the aid of a vehicular underpass that begins from Ponte Vittorio Emanuele up to Regina Coeli prison and Ponte Mazzini.

The project belongs to the category of *continuous processes*, in order to renew the old city centre and the portions of tissue aimed at reestablishing the historical-civic continuity of the cluster.

Fixation lines and fringe belts in Nanjing and Pingyao

Chinese city walls have, virtually throughout history, been notable for their length and massiveness. The building and renovation of city walls in China reached a climax during the Ming dynasty (1368-1644) (Wang, 2013). Nanjing and Pingyao, like many Chinese cities, have had a succession of city walls and a succession of alternations of rapid growth and hiatus or decline. The present city walls of the two cities, which are relatively well preserved, were largely created during the fourteenth century.

Nanjing

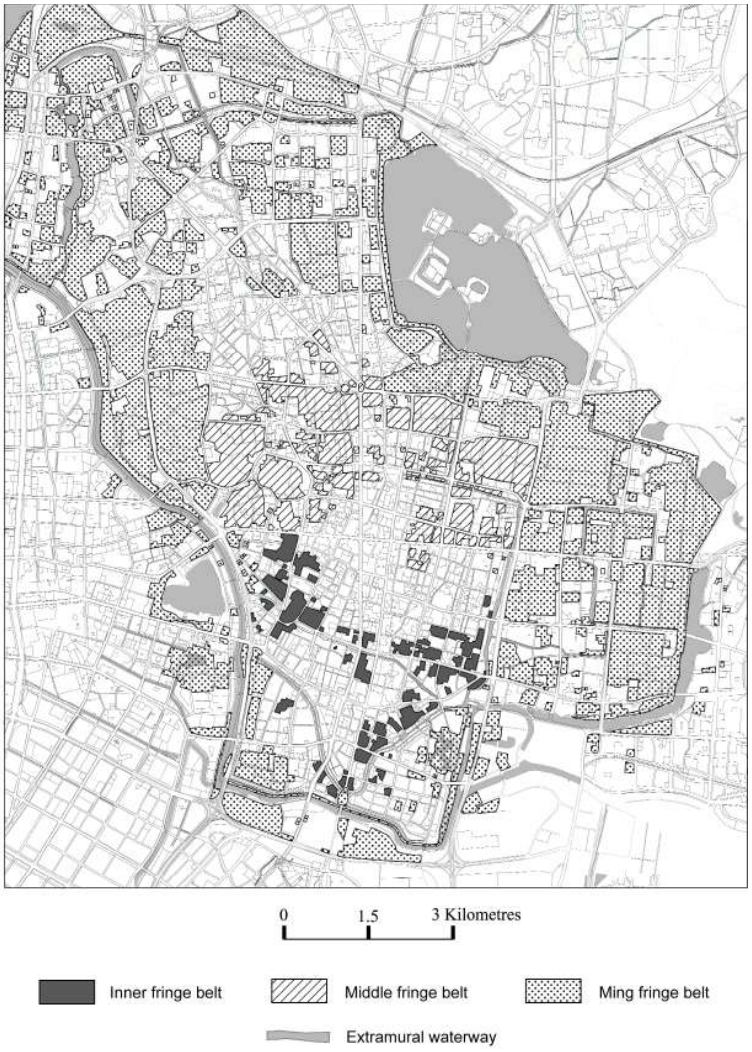
Prior to Nanjing's major physical expansion in the past half century, its major phases of growth have tended to be during periods when it was capital of China, or of a large part of it, notably the Liuchao period (third to sixth centuries), the Yangwu and Nantang periods (the first half of the tenth century), early in the Ming dynasty, and in the years 1927 to 1937 when it was capital of the Republic of China.

A major rebuilding of the city in the first half of the tenth century included encompassing by a wall extending over some 15 km (Yang and Wang, 2008). However, even much later, during the Song dynasty (960-1279), the effective northern limit of the urban area remained well south of the northern section of this wall (Compiling Committee for Nanjing Gazetteer, ed., 2008).

At the beginning of the Ming dynasty, in the last third of the fourteenth century, a massive northward extension of the city wall and a lesser eastward extension created a total length of 33.6 km (Yang and Wang, 2008), largely constructed of bricks and stone, much of it to a height of 12-15 m (Yang and Wang, 2008). This tripling of the previous walled area accompanied the designation of Nanjing as the capital of China, a status it retained for half a century until in 1421 it was displaced by Beijing.

The fringe belts of Nanjing distinguished in Figure 1 as inner, middle and Ming fringe belts differ in a wide range of morphological attributes from the areas they separate, notably in their layout, physical texture, and pattern of land use. The inner fringe belt

Figure 1. The fringe belts of Nanjing



includes plots close to the probable earlier fixation lines of the River Neiqinhuai and the River Zhongqinhui. The middle fringe belt occupies areas either side of the line of the northern section of the former tenth-century wall.

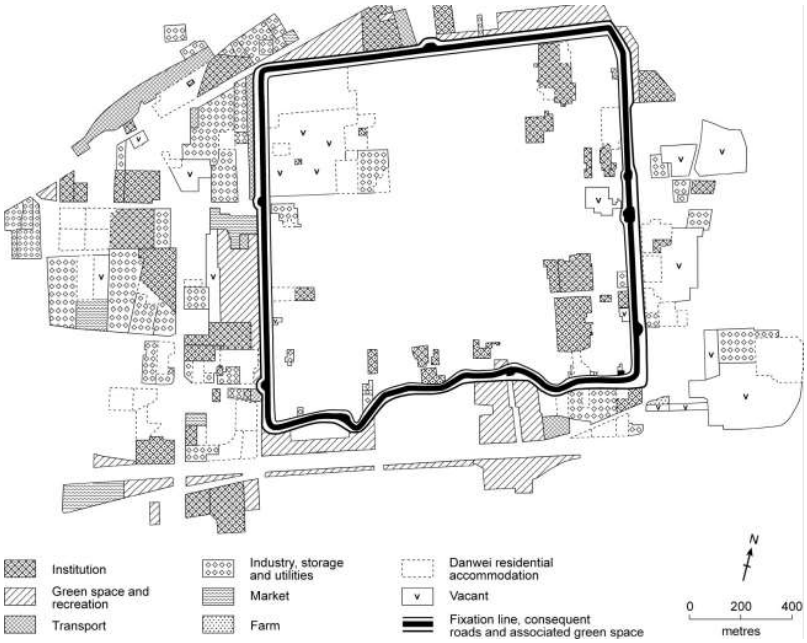
The most pronounced fringe belt is associated with the particularly strong fixation line of the Ming city wall. However, almost the entirety of that fringe belt within the northern part of the city was created well into the twentieth century, much of it in the 3 decades after 1949, long after European cities developed fringe belts in association with defensive walls.

Pingyao

Though small in comparison with Nanjing, Pingyao has had a long history as an important administrative and market centre within its region. After the Communist Party came to power in 1949, Pingyao was transformed into an industrial city. Its designation by UNESCO in 1997 as a World Heritage Site triggered a dramatic growth of tourism.

Reconstructing the city's historical development is largely dependent on analysis of the present pattern of streets and plots (Whitehand and Gu, 2007). Several streets appear to have been developed along lines of fortification at earlier edges of the settlement. As in Nanjing, the city wall was greatly extended in the fourteenth century, in the early Ming period, and the roughly square area within it covers about 2.25 km2. Also as in Nanjing, and in traditional China and medieval Europe more generally, religious or quasi-religious institutions,

Figure 2. The fringe belt associated with the fourteenth-century wall of Pingyao. Reproduced from Whitehand et al. (2011)



tended to be among the most space-using land uses. They tended to be attracted to the spacious sites that were available at the urban fringe, often locating just inside the city wall.

With the spread of the New Cultural Movement during the first 2-3 decades of the twentieth century, many historical institutional buildings suffered damage (Du, 2002). However, unlike earlier fringes of Pingyao, the fringe-belt sites associated with the surviving wall comprise a practically continuous zone, albeit of greatly varying width (Figure 2).

Up to the Second World War Pingyao was essentially a pre-industrial city. Like many cities in Europe, in the pre-industrial and early-industrial eras it retained agricultural activities within its city wall. However, as elsewhere in China, profound changes to the social and economic organization of the city began to occur in 1949, as a traditional service and administrative centre began to be transformed into an industrial city. Within half a century the built-up area expanded greatly beyond the city wall, tripling the city's physical extent. Significant changes also occurred within the walled city. As in Nanjing, a feature of this period of change, particularly between the mid-1950s and early 1980s, was the creation, mainly between the mid-1950s and early 1980s, of danweis, or work units (Compiling Committee for Pingyao Gazetteer, 1999); normally walled enclosures each containing a workplace, such as a hospital, school or factory, residential accommodation for those employed in the workplace, and services, especially social services, often including a communal dining hall and ablutions. These tended to augment the fringe belt associated with the city wall (Figure 2).

Conclusion

The major fringe belts that have developed in Nanjing and Pingyao show characteristic features of fringe belts that have been noted in previous studies of fringe belts associated with city walls, notably in Europe: for example, the open-grained character of the extramural in comparison with the intramural. They also have characteristics that distinguish fringe belts more generally from the urban areas in which they are embedded: for example, on average they have larger plots, lower building coverages and fewer road crossings.

However, these features need to be seen in relation to the major contrasts between Chinese history and that of the West. For urban morphologists, most of whom work large-

ly on Western cities, the pattern of morphological periodicities in China is strikingly different. Urban form in Western, or Western-influenced, areas has frequently been couched in terms of a series of morphological periods that share major commonalities over large parts of the world, albeit that their beginning and end dates vary geographically. In Europe these periods can be recognized extending back to classical times. In China, records of the historical development of urban form are not only more problematic but, as far as can be inferred from such limited documentation as periodical gazetteers and geographical encyclopedias, urban form, not least architecture, was much less differentiated over time, at least until the twentieth century.

The introduction of the danwei, and its proliferation between the mid-1950s and early 1980s, was particularly significant. In major aspects of architectural style and plan the buildings constructed during this period contrasted markedly with those of the pre-industrial era. The inclusion within numerous separate walled areas of both living accommodation and other functions, notably employment, introduced a somewhat different morphological and functional structure. The closest to an earlier equivalent, either in China or in other countries in which fringe-belt studies have been undertaken hitherto, was an institution, such as one with an educational or military function, in which family residential accommodation was included within the same plot as the principal function.

The articulacy of the fringe belts associated with the surviving city walls in Nanjing and Pingyao is fundamental to an appreciation of the morphogenetic grain of these cities. By the same token, it is of major importance for their conservation planning. Fortunately, the prospects for increasing awareness of this are on the whole improving in these two cities. Unfortunately this enlightenment is not widely shared elsewhere in China.

References

Barke, M. (1974) 'The changing urban fringe of Falkirk: some morphological implications of urban growth', *Scottish Geographical Magazine* 90, 85–97.
Chang, S. (1970) 'Some observations on the morphology of Chinese walled cities', *Annals of the Association of American Geographers* 60, 63–91.
Compiling Committee for Nanjing Gazetteer (ed.) (2008). *Nanjing gazetteer of urban planning*. 2 volumes (Jiangsu Renmin Press, Nanjing) (in Chinese).
Compiling Committee for Pingyao Gazetteer (ed.) (1999) *Gazetteer of Pingyao* (Zhonghua Shuju, Beijing) (in Chinese).
Conzen, M. R. G. (1960) *Alnwick, Northumberland: a study in town-plan analysis* Institute of British Geographers Publication 27 (George Philip, London).
Du, L. (ed.) 2002 *History of the old town of Pingyao* (Zhonghua Shuju Press, Beijing) (in Chinese).
Li, M., Yue, H. and Zhang, X. (2008) *The ancient city of Zhengzhou* (Henan Renmin Press, Zhengzhou) (in Chinese).
Louis, H. (1936) 'Die geographische Gliederung von Gross-Berlin', in Louis, H., and Panzer, W. (eds) *Länderkundliche Forschung: Festschrift zur Vollendung des sechzigsten Lebensjahres Norbert Krebs* (Engelhorn, Stuttgart) 146–71.
Wang, G. (2013) 'The city building movement in the Ming period', in Wang, G. (ed.) *Cities and buildings in the Ming period: distribution, layouts and regulations* (Zhongguo Jianzhu Gongye Press, Beijing) 5–30 (in Chinese).
Whitehand, J. W. R. (2005) 'Urban morphology, urban landscape management and fringe belts', *Urban Design* 93, 19-21.
Whitehand, J. W. R. and Gu, K. (2007) 'Extending the compass of plan analysis: a Chinese exploration', *Urban Morphology* 11, 91–109.
Whitehand, J. W. R., Gu, K. and Whitehand, S. M. (2011) 'Fringe belts and socio-economic change in China', *Environment and Planning B: Planning and Design* 38, 41-60.
Whitehand, J. W. R. and Morton, N. J. (2003) 'Fringe belts and the recycling of urban land: an academic concept and planning practice', Environment and Planning B: Planning and Design 30, 819–839.
Yang, G. and Wang, Z. (2008) *Nanjing gazetteer of city walls* (Fenghuang Press, Nanjing)

Old-New studies on City limits and Fringe belts. Expanding-Shrinking urban events. Brief notes on the internal and external frontiers in Chinese and African cities and on a new European limes on the Mediterranean Sea

Anna Irene Del Monaco
Facoltà di Architettura, Sapienza Università di Roma, Italy
Keywords: fringe-belts, frontiers, migrations, Hangzhou, Durban

Abstract

This paper aims to present further insights on the research issue of 'city and limits' based on previous studies already developed and published by the proponent in 2012 and in 2014.

Infact in Città e limes. Roma, Beijing, New York (City and limits. Rome, Beijing, New York), Nuova Cultura, Roma 2012, the proponent maintained that among the contemporary metropolises providing an authentic model of organised life and economic development, above and beyond national boundaries and geographical entities, two categories of individual cities can be clearly distinguished: first of all, the unanchored cities, among which can be numbered the great contemporary African metropolises and the Instant Cities of the Far East and the anchored cities (Roma, Beijing New York), which base their growth and their metamorphoses on the full length of their own past history, anchoring them (in point of fact) to the physical and symbolic structures that belong to the place they inhabit and to their memories.

Furthermore, in La città e i suoi limiti interni (The City and its internal limits) Bloom, Neaples, 2014, indeed, the thesis presented in Città e limes prevalently based on an ever growth model was discussed and compared to a model considering Life and death, as the prevalent historical urban condition and considering the new condition of Urban inclusion/exclusion.

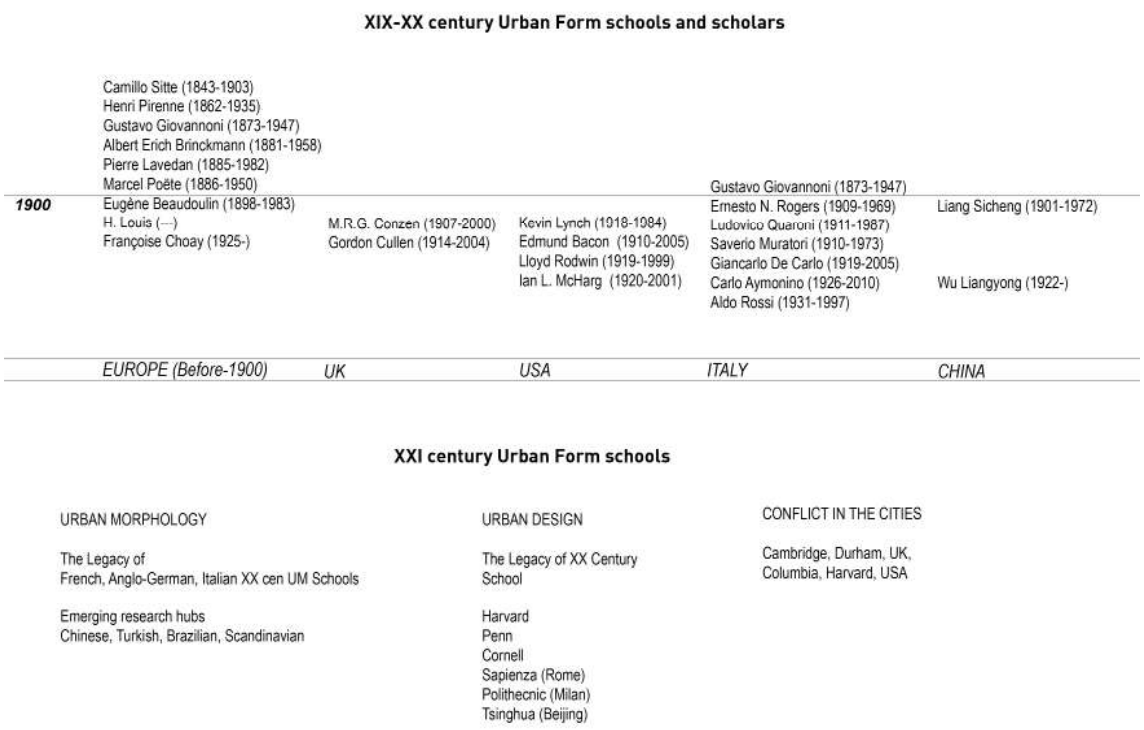
The proposed papers will comparatively analyze the mentioned published studies with the most significant researches on "fringe belts" published on Urban Morphology and with other international research groups working on "city limits" , "urban form" and "frontier urbanism".

Ever-growing urban form and the limits of fringe-belt theories

This paper presents comparative insights on city limits and fringe belts studies, considering the impact of historical and economic events – as migrations and ethnic groups coexistence – on urban typo-morphologies both as recent global issues and as historical retrospect conditions of urban life. In this framework 'internal' and 'external' urban boundaries emerge as concepts somehow related to city limits and fringe-belts studies that deserve a new agenda and additional research competences and supplying methodologies. Therefore, this study intends also to give evidence to the limitations of the traditional theories on urban form and fringe-belts if applied to contemporary urban events. The discourse moves from previous researches on the issues of 'the architecture of the city' and 'urban form' already published by the author in 2012 and in 2014. In *Città e limes. Roma, Beijing, New York* [City and limits. Rome, Beijing, New York] (Del Monaco, 2012), it is stated that among the contemporary metropolis providing an authentic model of organized life and economic development, above and beyond national boundaries and geographical entities, two categories of individuals (cities) can be clearly distingui¬shed. First of all, the unanchored cities, among which the great contemporary African metropolises and the Instant Cities of the Far East can be numbered. An then, the anchored cities (Rome, Beijing, New York), which base their growth and their metamorphoses on the full length of their own past history, anchoring them (in point of fact) to the physical and symbolic structures that belong to the place they inhabit and to their memories. To summarize the general sense of the research developed in *Città e limes. Roma, Beijing, New York* and to highlight the differences on the discourse on city limits involving architects and geographers it is useful to quote an earliest book of Ludovico Quaroni – Master of the School of architecture of Rome, an earlier companion and late academic 'mythical' antagonist of Saverio Muratori (Del Monaco, 2015) – entitled *L'architettura delle città* (Quaroni, 1939) in which he presents an 'evolutionary' vision of the processes regulating the growth and decay of a city: 'as any organism, the city too is sub¬ject to change; but cities must always be regulated by the laws of the composition. The forces that operate such transformation are, more of¬ten than not, beyond human control: they are the product of the social evolution of a people, of the progress or decadence of his culture'. Furthermore, in *La città e i suoi limiti interni* [The City and its internal limits] (Del Monaco, 2014), in¬deed, the thesis presented in *Città e limes*, prevalently based on an ever growth model, was discussed and compared to a model considering *Life and death* as the prevalent historical urban condition and considered the newest condition of urban inclusion/exclusion (Sassen, 2014) as discussed by the global agenda. Since these studies are mainly oriented on urban form questions, in order to distinguish comparatively the evolutionary attitude of cities growth, some references to the tradition of fringe-belts' studies will be stressed selecting the works of remarkable scholars. So, a chronological selection of excerpts by Jeremy Whitehand's papers are particularly suitable for this context: 'the fringe-belt concept, like many concepts about the structure of the cities, has been used almost entirely for explanatory rather than prescriptive purposes […] Put simply, a fringe belt is a zone of mostly extensive land use that comes into being at the edge of an urban area during a hiatus in outward residential growth. It is heterogeneous in plan, building forms, and land and building use. Institutions, public utilities, parks, recreational areas, allotment gardens, and certain types of industry are characteristic of its medley of land uses. When residential growth resumes, the hiatus leaves a permanent mark in that the fringe belt becomes embedded in the urban area' (Whitehand, Morton, 2013).

Seen from architects point of view the 'explanatory' nature of fringe-belt can be read as a partial approach, especially if, through an evolutionary development, a shrinking (Oswalt, 2005) urban phase suddenly follows an expanding phase because of economic and social events, not to speak of prescriptive intents. In the history of a city like London, for instance, the negotiation between the landowners and the city used to happen on the agricultural belt. Quoting Werner Hegemann's account on the development of London attributing considerable importance to a Proclamation act of Queen Elisabeth of 1580, Rasmussen allocates the importance of 'the interdiction to build within three miles

Figure 1. Urban Form Schools: an historica and geographical overview; elaboration by A.I. Del Monaco



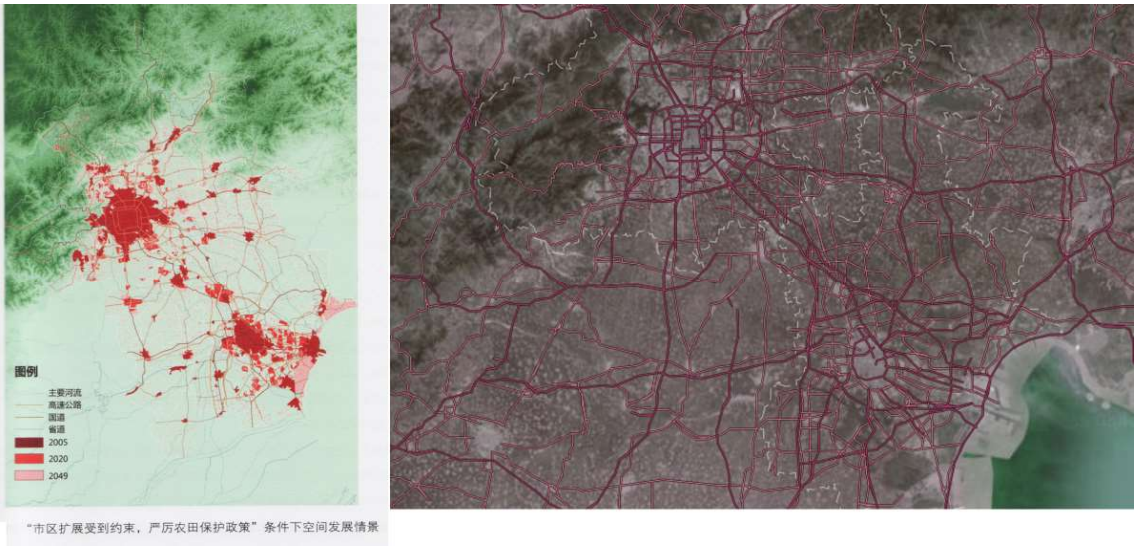
from the gates as an attempt to create a broad agricultural belt round the town and at the same time as an encouragement for developing proclamation would certainly be in advance of its age, anticipating the garden city ideas of late years' (Rasmussen, 1934). And also if we think of the Ring in Wien it can be affirmed that it had always had military purpose even after the expansion phases. Also in Ancient times cities like Rome or Leptis Magna experienced impressive shrinking phases: so even if cities are organisms their growth is not always linear or continuous.

As already stated, the contemporary historical and economical global urban events deserve additional tools of investigation and a more updated interpretation of the urban condition as Michael Conzen points out: 'Studies of urban fringe belts have multiplied in recent years, demonstrating the validity of this morphological concept in a variety of regions around the world. […] The analysis leads to speculations about the efficacy and limits of the fringe-belt concept to identify and account for variations in the texture of urban form across urban areas in diverse cultural contexts' (Conzen, 2009).

From traditional fringe-belts theory to ruptured fringe-belts. Migrations and Frontiers

If we consider the list of scholars involved in urban form researches active during the XIX-XX Century – some born before 1900 and some other within early 20's – we become aware of the fact that their theoretical efforts were applied to the construction of the modernization of their cities and to the reconstruction phases after WWI and WWII. Consequently, a traditional comparative analysis based on linear growth trends (size, geometry of fringe belt) risks to detect a partial perspective into an integrated whole. Taking into account contemporary global urbanization trends and cross-cultural comparisons on urban fringe-belts, Michael Conzen affirms: 'certain commonalities emerge, but there are also large differences in the number, scale, complexity, and even basic geometry of fringe belts apparent in this eclectic examination. These differences go well beyond simple explanations of site circumstances, size, and function of the city within the urban

Figure 2. Comparison between Beijing-Tianjing Aerial view (Google) and Beijing-Tianjing 2005- 2049 Scheme; the latter Source: Wu Liangyong, Yong Deng, Beijing 2049 Spatial Development Strategy, Tsinghua University Press, 2000.. The reality goes faster than planning



hierarchy, and result from essential contrasts in urban social values, property rules, and planning traditions' (Conzen, 2009). If we reflect on the chronological sequence of Jeremy Whitehand's publications available on the University of Birmingham web site, it is evident how his interest in fringe-belt studies – with different intensity – shifts from traditional city-growths themes to land use and urban landscape transformation issues up to the more recent interests in urban conservation in China. Whitehand maintained that in both Conzenian and Caniggian schools of thought, the urban landscape is viewed as an historical phenomenon: past, present and future are indissolubly linked. For both schools, sound planning is rooted in understanding the past. This type of perspective is easily neglected during explosive urban growth and change such as the one currently occurring in China: 'However, many of the concepts and methods that have been developed by the Conzenian and Caniggian schools are intuitively attractive for the task of understanding and planning Chinese urban landscapes' (Whitehand, Gu, 2003). Through this interpretation it is evident the possible change in studies on urban form in parallel to the growing interest from the academic contexts of emerging countries toward the solid bulwark of theoretical schools that ISUF Conference has been able to gather: traditional metropolis and recent megalopolis are not the same kind of urban individuals; also Chinese megalopolis are not the same one another: one thing is a planned Imperial Capital like Beijing, one thing is a sudden urban concretion like Shenzhen. And the possibility to establish comparative studies between Italian traditional ridge-settlements and historic Chinese wooden-built hill settlements, like the one in Guizhou area, is not an easy task – as I had chance to directly verify following a post-doc scholar from Tsinghua University of Beijing, Zhou Zhengxu (Zhou, Feng, 2015). The Caniggian theory is a relevant example in terms of methodology but difficult to be applied *tout court* to other 'constructive culture' and geographical contexts, as Muratori would have define the Italian and the Chinese one. Infact, Whitehand identifies by the title of one recent essays of his – probably indirectly – the risk of a too comprehensive and generic interpretation of the overall urban form historic events: 'The changing face of urban morphology: achievements and challenges' (Whitehand, 2014). So it is still in the domain of 'fringe-belt studies' – considering the historic and circumstantial importance of this definition – a study focused on the urban history of Beijing, considering the exceptional speed, economic and policies that a country like China is able to apply to its territories? In the last years the urban studies on

urban China organism have been a significant research challenge for Whitehand and Kai Gu (Whitehand, Gu, 2006). Infact in their paper *Research on Chinese urban form: retrospect and prospect* they point out an analysis prevalently based traditional urban form theories (feng shui), comparative studies, building up what can be defined an annotated bibliography on Chinese Historical Cities, prevalently Imperial cities (Steinart, 1990). So far giving evidence more to the foundation character of Chinese cities than to eventual fringe-belts evolving dynamics.

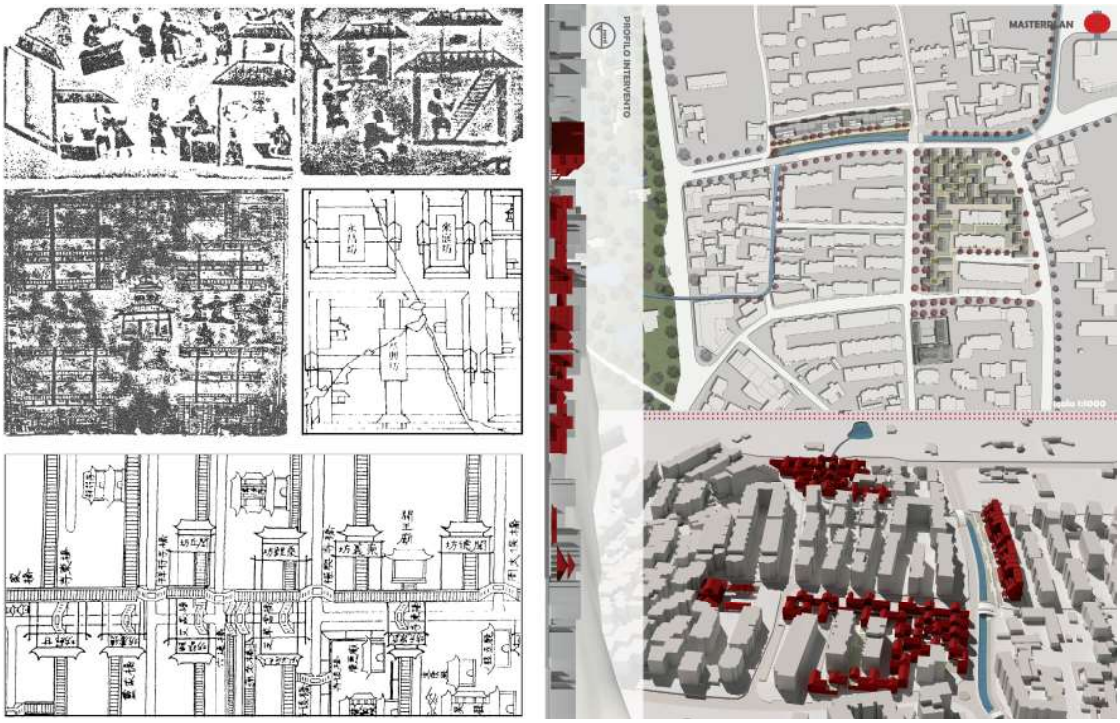
Limitless frontiers. The Beijing case

The fifth ring road in the 2004-2020 Beijing Master Plan (the contemporary inner-city, the edge of the municipality) could be read as the 'internal' boundary while the sixth ring road (outer-city) would be the 'external' one. Historically the case of Beijing presents us with a comparatively clearer and simpler picture as regards its city walls (the first fringe belt). The ideological *Genesis* of the city-temple of Beijing prescribed a regular, rectangular circuit of walls, over sixteen meters wide, since its *Material* consisted of earth faced in brick, using a technique that was exclusively employed, throughout Chinese urban history, for city walls and dams. [...] The concentric design of the walls of Beijing, centered on the core element of the system, the Forbidden City, can also be seen in the *Transformation* phase, when the walls were demolished by Mao Zedong in 1949, and would be replaced by a highway called the *second ring road*, whose route exactly matched the circuit of the demolished walls, and which would reverberate over the following seventy years in four successive concentric road systems, up to a present total of six city ring roads (Del Monaco, 2012). But looking at today Google Satellite views over Beijing-Tianjing area, we realize that the situation forecasted between 2005-2049 by the planning researches of professor Wu Liangyong's team (Wu, Deng, 2000) of Tsinghua University of Beijing became partially a reality. Beijing and Tianjin are spatially connecting at a speed that goes faster then planning or researches. Furthermore the development has been pushed to plan a super city called Jing Jin Ji (Super city in Northern China), a collective project under construction, that will be one of the three regional cores of China, with at least 2,10 millions inhabitants. Shanghai and Guangzhou, representing the other two regional cores, follows respectively with 2 millions and 1,99 millions inhabitants.

Internal and external migrations can have a significant impact on the typo-morphological layout of cities. One of the most relevant issue in Urban China influencing the existing cities-layout is the internal migration: the *hukou* system of household registration, established in 1958. It lays down the residence in the place of birth in a restrictive way. After the first three decades of rapid urbanization, the Chinese government seems determined to amend the fifty-year old hukou system in order to achieve the ultimate goal of the National plan of urbanization, i.e. 900 million people living in urban areas by 2025. The *hukou* system would be abolished completely in 'small' cities and more gradually in cities referred to as 'medium'. A comparison between the physiographic situation of the Chinese territory of the late Nineteenth century and the situation of the current urban and rural areas strengthens the hypothesis of a complete restoration of macro historical regions (Skinner, 1977) to recover the structural constants capable of providing a solution to the massive problems of contemporary China and giving a meaning to its modernity (Barbera, Del Monaco, 2014). Also the municipality of Rome is experiencing in the last decade new trends in the real estate market due to the considerable presence of migrants and dwellers scattered in huge areas (East, South-West) beyond the Junction (G.R.A. Grande Raccordo Anulare), the latest 'fringe belt' of the Capital City of Italy, as it is documented by BNL Paribas Bank Annual Reports. But also in a city like New York migrations and public housing shortage have an important political impact in municipal investments and policies on urban areas (US Census Bureau 2011). Moreover migrations recall frontiers issues. The latter was the main nexus between 'city limits' and the idea of *limes* discussed in *Città e limes*, quoting the ancient Roman fortified structure called *limes*, the most famous of which was located in the German territories.

Today Europe is experiencing exceptional events along the frontiers of the Mediter-

Figure 3. Hangzhou. Fang, Shi and Fangxiang (from the historical stone/ bricks carvings) in Lin'an (ancient Hangzhou). Drawing from the Graduation Thesis of Silvia Aloisio (Sapienza University Facuty, of Architecture; Advisor: L.Barbera, Co-Advisor: A.I. Del Monaco): new low-rise development in the historic pattern of Hangzhou



ranean see. The spatial control and evolution of the Mediterranean frontier will be fundamental to manage the political balance and to define alternative economic strategies (Canesi, 2004). The southern coasts of Italy and Europe could be considered as a new European limes, indeed, considering the impact of the number of migrants coming from Northern and Sub-saharan Africa and Asia on the territories and coasts facing the Mediterranean sea. It would be interesting to develop a research that, moving from the fundamental thesis of Henri Pirenne in *Mohammed and Charlemagne* (Pirenne, 1937) – that the Mediterranean World of Antiquity was broken by the rise of Islam in the seventh and eighth centuries and not by the Germanic invaders of the fifth and sixth centuries – tries to interpret the actual frontier of the Mediterranean see as a new European limes.

In this framework researches as the one conducted by Wendy Pullan on frontiers urbanism (Pullan, 2011) or Stephen Graham on splintering urbanism and city-conflicts (Graham, 2011) are particularly relevant to interpret the contemporary urban contexts especially on issues of bourdaries and urban edges. Even Richard Sennet is starting a new discussion on The Open City: "Steven Gould draws our attention to an important distinction in natural ecologies between two kinds of edges: boundaries and borders. The boundary is an edge where things end; the border is an edge where difference groups interact. At borders, organisms become more inter-active, due to the meeting of different species or physical conditions; for instance, where the shoreline of a lake meets solid land is an active zone of exchange where organisms find and feed off other Organisms." (Sennet, 2015). They could be considered as the contemporary correspondent of research issues like the one collected in *Siege Warfare: The Fortress in the Early Modern World 1494-1660* by Christopher Duffy (Duffy, 1997) or even in a very famous book by Viollet-le-duc, Histoire d'un fortress (Viollet-le-duc, 1874).

Inner fringe-belts and ethnic groups: the case of Hangzhou (P.R. China) and of Durban (South Africa)

Urban cultures gathering different ethnic groups tend to developed an idea of the city as *collective memory* involving the need to create identifying factors that would induce the current inhabitants (who belong to many different races and cultures) to have an awareness of themselves within the spatial boundaries and symbolic elements of the city that surrounds them. To this end, the physical, historical *limines* (plural of *limes*) of the city, where they exist, are certainly among the factors that help to give a sense of belonging and an identity which every person or group of persons needs and expects from their city. 'To give an example, a complex urban culture that has been crucial to the creation of European civilization, namely that of the vast area of what is now Germany, has regarded the question of the boundaries of a city, the *grenze*, as so important that German scholars have continuously carried out studies and researches into the definition of the *external* and *internal confines* of past and present cities, which they see as complicated structures made up of a multitude of demarcated areas containing different social classes and different ethnic groups (historically, Germans, Jews, Slavs, Italian merchants, etc., now partially replaced or enhanced by communities of American military personnel, or Muslim communities from various countries), each one distinct from the others yet all enclosed within a larger perimeter which includes them, defends them and controls them' (Del Monaco, 2012).

The traditional Chinese City (internal boundaries)

Surprisingly, the classical Chinese city (preceding the Mongol empire of Kublai Khan) was also constructed, to an even more rigorous extent, in demarcated *blocks*, each one corresponding to a different social class or ethnic group, whose separate identity was illustrated by symbolic images set up at the boundaries to each block called *fang* – walled courtyard houses.

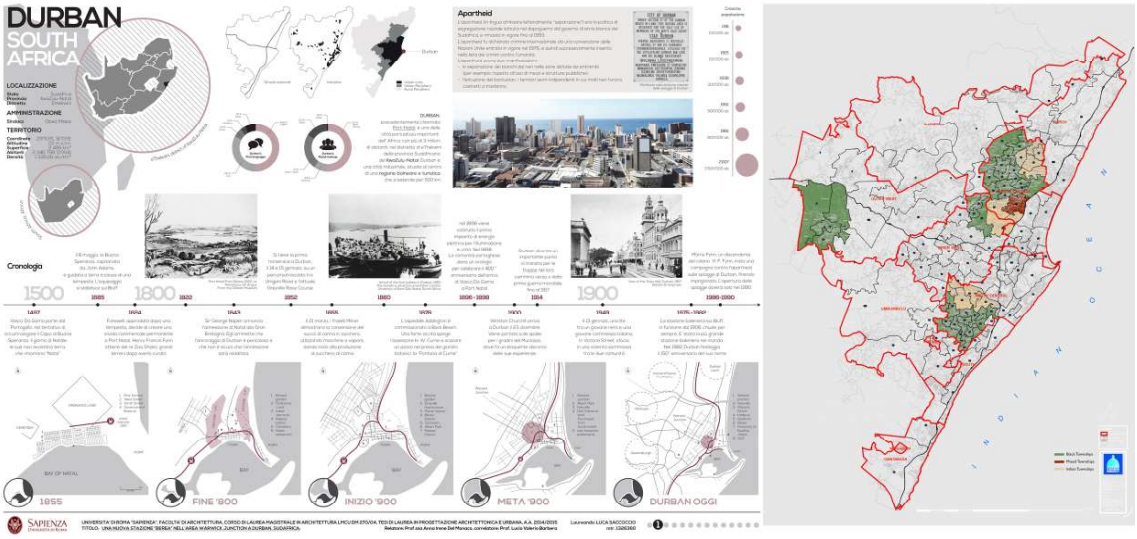
There has been recently a bourgeoning (Miao Xu and Zhen Yang, 2009) of researches and design studies trying to demonstrate the historical and cultural connection between fang (wards) and *danwei* (work units) and even to contemporary housing compounds – the first comparison is sharable instead of the second one. A famous painter of Song Dynasty (960–1279 ad), Zhang Zeduan, depicted in his famous drawing 'Qing Ming Shang He Tu', walled courtyard houses – *fang* or wards (Friedmann, 2005) – in the bustling urban area with diverse commercial activities. It seems that different works corresponded to different ethnic groups. The location of the drawing is supposed to be Kaifeng (a former Song Capital city). This painting is often used to describe the urban environment of another historic important town, Hangzhou (the Imperial Capital of Lin'an during Song Dynasty), whose layout and organization in *Fang, Shi* and *Fangxiang* is clearly described by drawing collected in (Zhou, 2004). So Hangzhou is an historical case study of 'internal boundaries'. Many other Chinese town were organized in fang as it is evident from the collection of pictures organized by Wu Liangyong in his book of 1986 in *A brief history of ancient Chinese city planning* (Wu, 1986): there are cities like Ye, Capital of Wei Dynasty (Linzhang, Hebei, around 200A.D.); Xinfan in Sichuan and Tang Chang'an.

Also Piper Gaubatz in her book *Beyond the Great Walk urban form and transformation on the Chinese frontier* (Gaubatz, 1996), presents an interesting overview (maps from early 1900) of Chinese double-walled cities of frontiers where the inner walled city included Chinese-Muslim ethnic groups: Xining, Langzhou, Kunming, Urumqi, Hothot.

Cogent African Cities: Durban and its townships, Khartoum and its informal settlements (external boundaries)

The growing research interest on the contemporary condition of African cities is producing interesting essays on the urban identity of African emerging cities, especially relating to the post-colonial and colonial development phases and characters. Among different post-colonial African cities, Durban, a city situated on the east coast of South Africa in the province of KwaZulu-Natal (Orli, 2013), often marked as a city by the layered

Figure 4. Durban. Historic development and features from the Graduation Thesis of Luca Saccoccio (Sapienza University, Facuty of Architecture; Advisor: A.I. Del Monaco). Maps of the Townships in Durban Municipality, province of KwaZulu-Natal



and entangled urban narrative is a significant example for 'external boundaries'. The pre-colonial and colonial city (called CBD) is a grid city built on British-Dutch model facing an harbor and an alive beachfront. The official municipal boundary includes about one hundred settlements, between legal townships or suburbs. Townships gather population mainly by ethnic groups: black Africans, colored, Indians or Asians. Despite the important infrastructural lacks in the connection between the townships and the CBD (up to 30km) the number, the economic and political importance of some ethnic groups in Durban, as Indians for example, brings back an interesting case study of urban democracy management that continuously renegotiate power, spatial boundaries and opportunities. The aerial view of Durban municipality describes the core CBD area facing the harbor, some earlier livable neighborhoods for the whites close by a wonderful Botanic Garden and a Japanese Park, surrounded for kilometers by a wide surface of floating individual or semidetached dwellings filling the ring of townships around the CBD area inhabited during the night but for unofficial immigrants coming mainly from Central Africa bringing with them social issues and endangering a resilient (UIA Durban 2014) balance in the urban environment.

Another cogent city in the overview of historical African cities is Khartoum, whose urban and natural history is marked by the two Niles (Blue and White) intersection used to be a tripartite city made of settlements separated by the water. It appears as, and is lived as, two cities divided by the White Nile, Khartoum and Omdurman, plus an expanse of modern building on an enormous space which comprises a new city, Bahri, beyond the Blue Nile. The separation between the two halves of the city originally derived from the different ethnicity of the inhabitants; on one side the British and Egyptians, on the other the native Sudanese, who took part in the great rebellion led by the Mahdi, Muhammad Ahmad, in 1885. Today those ethnic and cultural aspects are not an issue (1956); however, the city is unable to transform the confluence of the two rivers into a factor that could unite its two parts. In recent years Khartoum double the population at first because of informal settlements made up by Internal Displaced Persons after the Darfur war. The informal settlement became in some way made official and other formal settlements – whose layout imitate the informal ones – were built beyond them expanding his official boundaries.

Conclusion

The comparative insights on city limits and fringe-belts presented had the scope to give evidence to the contradictions and limitations of the traditional theories on fringe-belts extensively applied to the complexity of both contemporary and historical metropolis and megalopolis. The richness of aspects presented in the Isuf 2015 fringe-belt panel by scholars coming from different cultural contexts proposing various kind of researches demonstrate the attractivenes of fringe-belt theories. My argument is that it is a richness that deserve to be addressed more appropriately to preserve the importance of the original concept of fringe-belt and to determine a better focus on the latest (or not latest) urban events growing as timely in the global context.

References

Al-Shahi A. & Lawless R. (2005), *Middle East and North African Immigrants in Europe: Current Impact; Local and National Responses* (Routledge).
Barbera L., Del Monaco A. (2014), 'A Rural-Urban Metamorphosis in China: The Real Great Leap Forward?', *L'Architettura delle città. The Journal of the Scientific Society Ludovico Quaroni,* n.3-4-5/ 2014 (Edizioni Nuova Cultura Roma) 245-268.
Canesi M., (2004), *L'altra Globalizzazione. Una nuova offerta produttiva nell'area del mediterraneo* (Franco Angeli).
Conzen M.R.G, Cataldi G., Maffei G.L., Maretto M., Marzot N., Strappa G. (2012), *L'analisi della forma urbana. Alnwick, Nor¬thumberland* (Franco Angeli, Roma).
Conzen M.P. (2009) 'How cities internalize their former urban fringes: a cross-cultural comparison', Urban Morphology, Volume 13.1.
Del Monaco, A. (2012) *Città e limes. Roma, Beijing, New York,* (Nuova Cultura, Roma).
Del Monaco, A. (2014) 'La città e i suoi recinti interni', *Bloom* n. 20, 47-53.
Del Monaco, A. (2015), 'Comparative notes on Saverio Muratori and Ludovico Quaroni's urban projects: typology-morphology vs intuition or Piacentini's gymnasium?', In Oliveira V., Pinho P., Batista L., Patatas T, Monteiro C. (ed.) (2014). *Our common future in Urban Morphology*, FEUP, Porto.
Duffy C. (1997), *Siege Warfare: The Fortress in the Early Modern World 1494-1660*,Routledge.
Friedmann J. (2005), *China's Urban Transition* (University of Minnesota Press).
Gamal M. H., Bahreldin I.Z., 'Khartoum 2030', *L'Architettura delle città. The Journal of the Scientific Society Ludovico Quaroni,* n.3-4-5/ 2014 (Edizioni Nuova Cultura) 35-60.
Gaubatz, P., (1996), *Beyond the Great Walk urban form and transformation on the Chinese frontiers* (Palo Alto CA: Stanford University Press).
Giudici C.(2005), *L'Italia di Allah. Storie di musulmani fra autoesclusione e desiderio di integrazione*, Bruno Mondadori.
Glynn S.(2005), 'East End immigrants and the battle for housing: a comparative study of political mobilization in the Jewish and Bengali communities' , *Journal of Historical Geography* (Elsevier).
Graham S., (2011), *Cities Under Siege: The New Military Urbanism* (Verso).
Marx C., Charlton S., *The case of Durban, South Africa*, Working Paper. UNDERSTANDING SLUMS: Case Studies for the Global Report on Human Settlements 2003.
Orli B. (2013), *Palimpsest African Urbanity: Connecting pre-colonial and post-apartheid urban narratives in Durban*, in Simone A.M., Pieterse E., Tavengwa T., Rogue Urbanism (ACC & Jacana Media) 161.
Oswalt P. (2005), *Shrinking Cities: Volume 1* (Hatje Cantz).
Pirenne H. (1937), *Mohammed and Charlemage* (Laterza 2005, first edition1937).
Pullan W., (2011), 'Frontier urbanism: the periphery at the centre of contested cities', *The Journal of Architecture*, Volume 16 Number 1.Pullan W., Baille B., (2013) *Locating Urban Conflicts: Ethnicity, Nationalism and the Everyday*, 2013
Quaroni, L. (1939), *L'architettura delle città* (Sansaini, Roma).
Rasmussen S.E. (1934), *London the unique city* (The MIT Press) 68-69.
Rosenberg L., Vahed G., Hassim A., Moodley S., Singh K. (2013), *The Making of Place: The*

Warwick Junction Precinct (Durban University of Tech-nology Press).
Sassen S. (2014), *Expulsions. Brutality and Complexity in the Global Economy* (Harvard University Press).
Skinner, G.W. 1977 (ed.), *The city in late Imperial China* (Palo Alto, CA: Stanford University Press).
Steinhardt, N.S. (1990), *Chinese imperial city planning* (University of Hawaii Press).
Viollet-le.duc E.E.(1874), *Histoire d'une forteresse* (Bibliothèque d'éducation et de récréation, Paris).
Whitehand, J.W.R, Morton N.J. (2003), 'Fringe belts and the recycling of urban land: an academic concept and planning practice', *Environment and Planning B: Planning and Design*, volume 30, 819-839.
Whitehand, J.W.R., Gu, K. and Whitehand, S.M. (2011) 'Fringe belts and socioeconomic change in China', *Environment and Planning B: Planning and Design* 38, 41-60.
Whitehand, J.W.R., Gu, K.(2006), 'Research on Chinese urban form: retrospect and prospect', *Progress in Human Geography* 30, 3, 337-355.
Whitehand, J. W. R. (2014) 'The changing face of urban morphology: achievements and challenges', *Urban Morphology* 18, 95-96.
Wu, L. (1999), *Rehabilitating the old city of Beijing. A project in the Ju er Hutong neighborhood* (UBC Press).
Wu, L. (1986) 'A brief history of ancient Chinese city planning' (Urbs et Regio, Sonderband 38, Gesamthochschulbibliothek).
Wu L., Deng Y., (2000) *Beijing 2049 Spatial Development Strategy* (Tsinghua University Press).
Zhou Y. (2004), *The structure of an Imperial Chinese city: A person-environment study of Lin'an* (1123-1278), National University of Singapore, Dissertation.
Zhou, Z., Feng J. (2015), 'Construction of Ethnic Minority Settelement in Mountainous Are in Guizhou under Survival Pressure: A Case study of Biandan Mountain Area ', *City Planning Review,* 2015(9), 74-81.

Sitography

Ian Jonhson (2015) http://www.ian-johnson.com/2015/07/Birth-of-a-supercity
Miao X. and Zhen Y. (2009), *Design history of China's gated cities and neighbourhoods: Prototype and evolution* URBAN DESIGN International, http://www.palgrave-journals.com/udi/journal/v14/n2/full/udi200912a.html
Richard Sennet (2015): https://www.richardsennett.com/site/senn/UploadedResources/The%20Open%20City.pdf

Radial fringe-belt formation

Daan Lammers, Ana Pereira Roders, Pieter van Wesemael
University of Technology Eindhoven, The Netherlands
Keywords: Eindhoven, urban growth, radial fringe-belt

Abstract

The reference to the concentric city model, that is implicitly incorporated into the fringe-belt concept, has resulted in the under-representation of fringe-belt studies concerning other growth models, such as radial models. Only few studies draw explicit attention to the validity of fringe-belt properties for non-concentric belt forms. This paper seeks to contribute to this gap, by examining general processes of fringe-belt formation and transformation, being applied to the specific case study of the radial fringe of Eindhoven.

Eindhoven is today a post-industrial town, located on the elevated sandy land, in the southeast region of the Netherlands. The radial fringe of the town came to development prior to the planned extensions of the industrial revolution and post-war periods. Crucial to understand the logic of the formation and embedding process of the radial fringe is the fact that the notion of centrality was not directly linked to the central city but primarily to the pre-existing polynuclear network from an earlier agricultural society and socio-economic development

The case study of Eindhoven demonstrates two fundamental aspects that point out a distinct logic to the radial fringe. The first concerns the geographical and functional relationship between the fringe and the radial access roads. The second concerns the geographical location of the fringe plots related to the central core of the town. The analysis leads to speculations on the role of the embedded fringe structure within a new geographical configuration of the urban economy, social structure and urban governance.

Introduction

The roots of the Conzenean interpretation of the fringe-belt phenomenon lie in the effects of earlier limitations on urban growth on the townscape (Whitehand, 1988, p. 50). Conzen observed that during a pause in the outward growth of a town, extensive non-residential land use tends to form a fringe-belt around the edge of the built-up area (Conzen, 1960, p. 58). If, at a time of boom and demographic growth, the town physically starts to expand again, new residential districts leap-frog the fringe zones, which remain as fossils of earlier urban development. Conzen discovered that a fringe-belt was more than just a historical reference within the present townscape. He elaborated the theory of the fringe-belt as an analytical instrument to put order into the complexity of urban development. Discriminating the fringe-belt as the relict of crisis, build for non-residential uses, mostly institutional and also later on the zone in which adaptation to new urban program is concentrated.

Since 1936, when Herbert Louis first defined the phenomenon as the urban fringe-belt, two overviews were published on the development of the concept. Whitehand (1988) discusses the expansion of fringe-belt research to different national contexts as well as the enlargement of the semantic field through the incorporation of building cycles, rent theory and innovation, and it opens a perspective from the standpoint of town planning. Conzen (2009) aims to assess the concept's performance in different cultural settings, by examining the fringe-belt structure of several cities drawn from contrasting urban cultural traditions in Europe and the new world. The comparative analysis provides an insight in the complex structure of the research field, but it also leads to the exposing of processes and form issues related to fringe-belt formation which do not directly accord with the conventional definition of fringe-belts. For example it concerns fringe-belt features, like the great amount of houses in the case of Lleida (Vlagrasa, 1990), but more essential to the scope of this paper is the questioning of the belt-like form, when referring to Chicago's geographic pattern of fringe-belt elements forming 'radial corridors related to shorelines, rivers and other transport axes' (Conzen, 2009, p. 47).

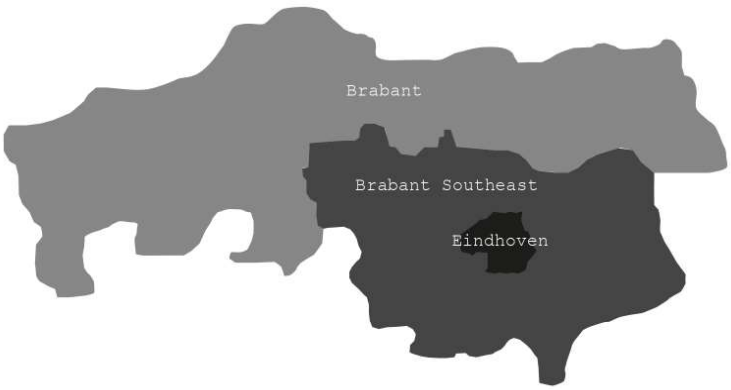
Although few more recent studies have addressed the value of non-concentric fringe-belt formation (Scheer, 2001; Foot, 2000; Gospodini, 2006), no specific studies are to be found about the fringe-belt concept related to radial city development. It is of topical relevance to seek to fill this lacuna, first in the light of recent shifts in urban economy and its concrete geography (Läpple, 2009). Fishman (2005) theorizes a new core-periphery balance, arguing that the reurbanization of the city core 'is likely to be a countermovement to the continuing power of decentralization rather than the single dominant pattern within the region'. Secondly the topic is relevant within the context of two competing paradigms of the European debate on spatial policy: the territorial city (Corboz, 1983; Indovina, 1991) and the compact city (Boelens, Wierenga, 2011).

This study aims to define the relationship between the radial form of growth of a city and the form of its fringe-belts. By investigating the town of Eindhoven as a case study, this research seeks to gain insights on the role of the radial fringe-belt in the modernization of a region, as well as, the way that shapes the urban fabric itself.

Eindhoven represents a radial urban growth during the successive phases of industrial development (Fig. 1). Results are to be used to the establishment of some basic principles and to discuss morphological phenomena. It may be expected to yield a number of concepts applicable beyond the young industrial towns on the sandy territory of south-east Brabant in general and to those in other countries.

This paper consists of three main sections. First we detail the methodology. Secondly, the formation of the radial fringe-belt within the larger context of an urbanizing region of Eindhoven is explained. Thirdly, the formation and transformation of the radial fringe-belt is analysed on a detailed level by means of a case study on the Eindhoven district of Gestel.

Figure 1. The city of Eindhoven in its region

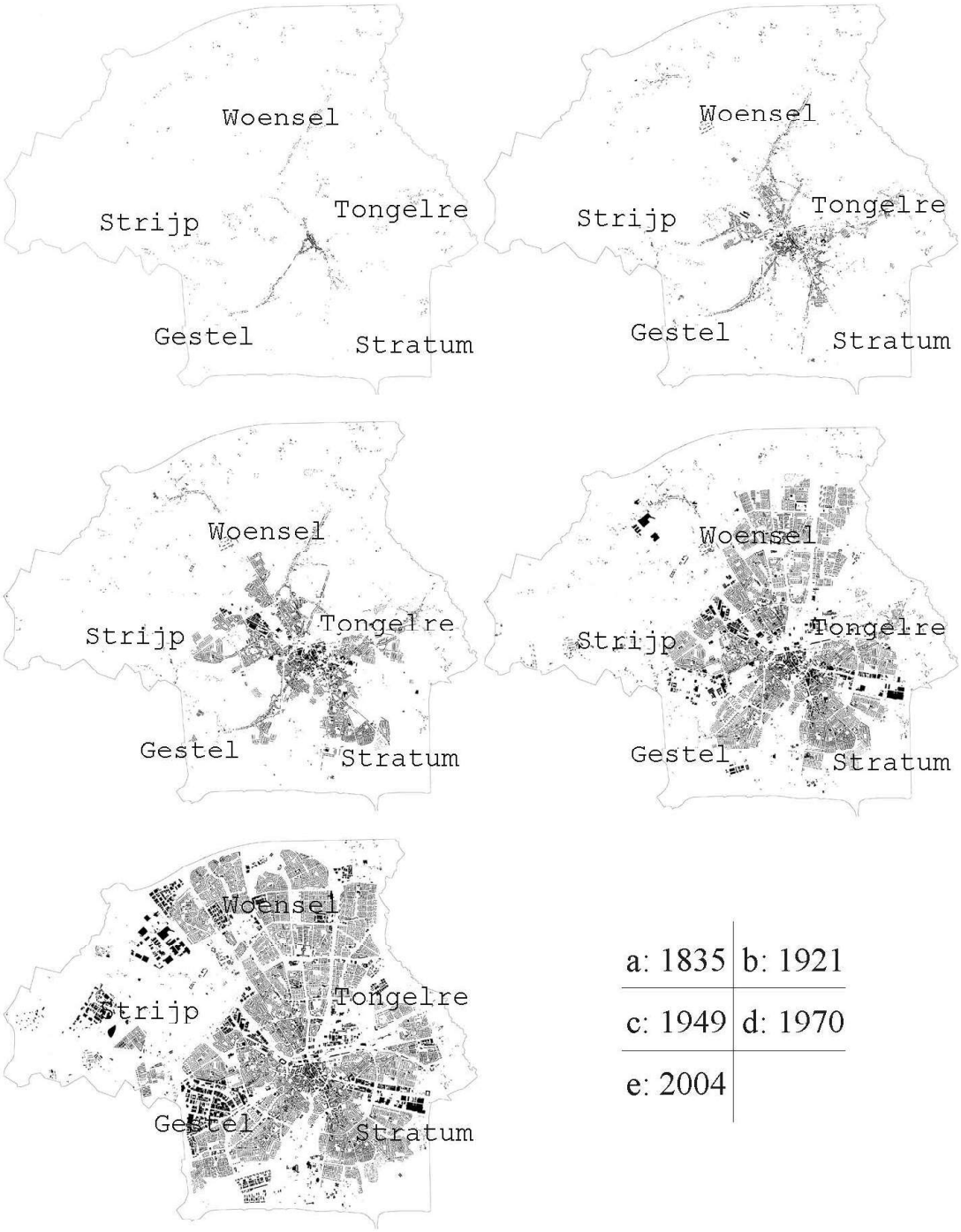


Methodology

The fringe-belt concept is rooted on the morphogenetic approach to the development of urban form – 'the tracing of the evolution of urban form in terms of their underlying formative processes' (Whitehand, 1981) – often referred to as the evolutionary approach (Conzen 1960, p.7). This approach is based on the view that a town, like any object of geographical investigation, is subject to change (Conzen, 1960, p. 6). The morphogenetic approach is a diachronic perspective on the morphological analysis, which aims to search for explanations of the mechanics of creation and transformation of urban forms (Levy, 1999). It is an attempt to reconstruct the morphologic genetics of a place, as well as, the logics behind its historical development. The morphogenetic approach forms the methodological backbone within the tradition of the British morphological school (Moudon, 1997).

The development of the radial fringe-belt of Eindhoven was investigated by applying methods mainly derived from town-plan analysis. The main aim was to define the relationship between the form of urban growth and the form of its radial fringe-belt. The analysis consists of two steps. First, form and processes are reconstructed through the method of successive geographical cross-sections, based on the thesis that the present townscape is the accumulated record of distinct morphological periods (Conzen, 1960, p.9). The primary source is the historical series of topographical maps and the Morphological Atlas Eindhoven (Rutgers, 2005). Secondly, the reconstructed forms and processes are categorized in three types: centripetal and centrifugal, and diffuse. The latter represents the hypotheses of the axial development logic of the specific case of the radial fringe-belt. This hypotheses finds its origin in the literature on nebular urbanization of the Flemish territory (Dehaene, Loopmans, 2003; Meulder, 2008; Loeckx, Meulder, 2005), where the casuistry of settlement patterns of Dutch Brabant is related to (Janssen, 2010, p. 348). And to this point a supplementation is made to the method of the town plan analysis, which builds on Boeri's critical argumentation towards the 'ancient zenithal paradigm', which has 'cancelled the dimension of real-time evolution' (Boeri, 1999). As Norton (1982) states, a static or semi-dynamic analysis does not confine to permit the detection of a process. Therefore the time factor should explicitly be included for any complete modelling of a process and its spatial implications. Morphogenetic processes are hypothesized based on secondary literature, describing the local and regional history. Subsequently, this information is sustained by primary historical sources such as cadastral and notarial data. Detailed real-time development of transformation of plot and block-plan configurations are traced by the analyses of series of historical cadastral fieldwork maps.

Figure 2. The form of urban growth of Eindhoven



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Eindhoven, urban growth and fringe-belt formation

The territory of Southeast Brabant is crisscrossed by small rivers and streams that used to flood adjacent lands in spring and autumn. Farmsteads, hamlets, villages and their interconnecting roads have developed on the higher stretches of land between those

streams. The typical landscape expresses a rich organic variety in the spatial configuration of its elements The particular case of the area around Eindhoven shows a radial form, thanks to the meeting of several streams. From the narrow Eindhoven core, long radial roads reach the neighbouring municipalities of Gestel, Strijp, Woensel and Tongelre (the community of Stratum was more centrally located).

The expansion of industrial Eindhoven consists of four morphological periods (Fig. 2): early industrial (1850-1920), heydays of industry (1920-1940), late industrial (1945-1970) and post-industrial (after 1970). Each period has been characterized by distinctive planning ideologies observable in the urban fabric.

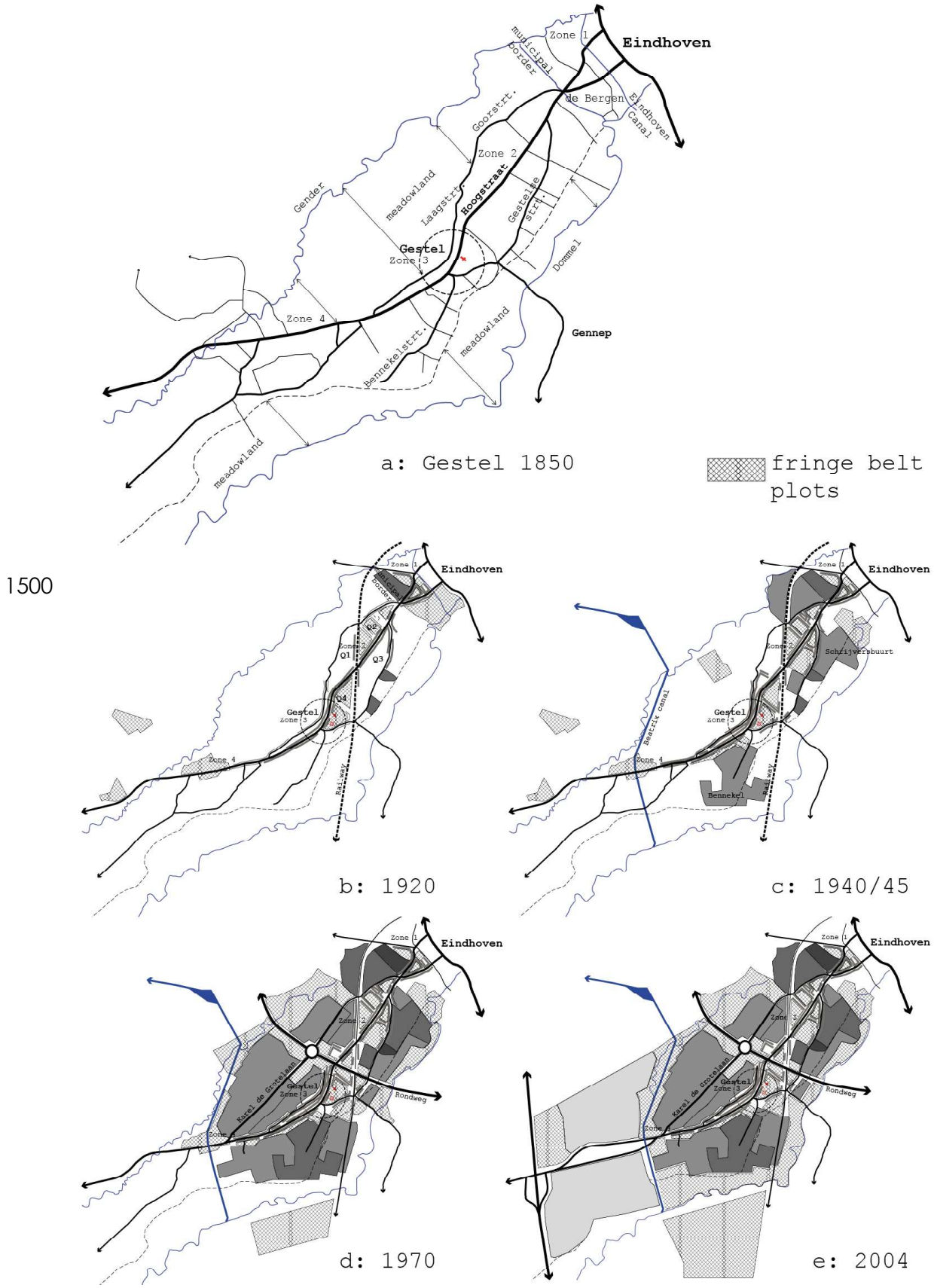
In the second half of the 19th century the infrastructure grew most rapidly. Since 1866 Eindhoven is accessible by train, and regional transport provided by tramlines. Regional roads between the villages and the town of Eindhoven were improved. The Eindhoven canal, finished in 1846, accelerated the growth of the town's industrial economy, and consequently caused a fundamental shift in the spatial distribution of the industrial elements, as well as, the housing locations. Factories coagulated in the eastern part of the town centre, around the head of the canal, and working-class houses crystallized between the existing farmhouses and labourer's cottages along the long radial roads. A bird eye perspective pictures Eindhoven as a spider with five legs (Fig. 2a, 2b). Although the region represents a strong socio-economical and spatial unity, the political discord between the municipalities of the central town and the five neighbouring villages proves to be unstable under the pressure of the industrial expansion. This instability led in 1920 to the annexation of the six municipalities into one political unity, the Greater Eindhoven. As a consequence of scaling up the administrative and institutional structure, the municipality is statutory obliged to create a spatial structure plan for the city (housing act 1901). In 1918, a first preliminary plan is prepared by Cuypers and Kooken (Oorschot, 1982).

Despite the first official plan for Greater Eindhoven by Kools in 1922, the expansion of the city during the heydays of industrial development remains quite unorganized (Fig. 2b, 2c). Housing projects are developed in small patches, ad-hoc, mainly eccentric, connected to the old arterial roads or even lacking of any connection to the spatial structure. Some parts of the planned tangent road are realized, as integrated parts in street-plans of housing districts, and most replacements of slum houses is found along the old arterial roads. The few fragments of Kools' plan realized are linked to the catholic grounds and its interwovenness in the political and societal context of southeast Brabant (Verstegen, 1999, Reijndorp, 1991). The population of Eindhoven increases from 48.000 in 1920 to 113.500 in 1940 which leads to an increasing housing shortage, owing to a persisting unsuited policy. Despite the planned ambition, the lack of financial resources have difficult the redistribution of industrial locations. Beekman suggests that the persistent lack of authority was due to both cultural and geographical reasons (1982, p. 76).

After the war, reconstruction plans are combined with the improvement of the inner-city infrastructure and its connection to the emerging regional network of express roads and highways. The final closure of the middle tangent road in 1956 had a strong impact on the city town plan and its operational structure. Although the pre-war housing shortage persists, new expansions start to develop more in line with planning. The plan of Kuiper (1946) fundamentally builds on the principles of De Casseres' foresighted planning of 1930's General Expansion Plan and the Regional Plan De Meyerij (Wagenaar, 2011, Bosma, 2003). It expresses clear relations to the geographical context. Two planning principles can be distinguished: first the axial expansion of the arterial ribbon on the sand ridge of Gestel; and second, a block pattern which fills the space between the old radial roads crossing the higher stretches of land in the southeast (Stratum) and north part (Woensel) of the city (Fig. 2d).

While the industrial economy develops both quantitatively as well as qualitatively, also shifts occur in the location factors concerning network modalities. Additional to water and railway connections, the rise of car and truck transport made locations related to the street network more important for industry. Plans are made to relocate and to allocate new areas in the city towards the car infrastructure, as well as to adapt the infrastructure to new requirements to attract new industries to the city.

Figure 3. The form of urban development of Gestel, and the formation of the radial fringe-belt



The development of the infrastructure after 1970 mainly concerns the expansion of the supra-local ring segment of highways surrounding the city at the west side. The existing arterial structure is partly connected to the highway system, which results in a new configuration of the urban infrastructure and the location factors of urban sites and districts. In the development of the built-op urban area two dominant patterns are identified (Fig. 2e). The first regards the outward expansion in the form of cauliflower neighbourhoods, villa estates, and in the 90's the VINEX expansions. The second concerns the redevelopment of abandoned inner-city industrial sites.

Based on the reconstruction of the process of urban growth and town-plan analysis three fringe-belts can be identified: concentric inner and outer fringe-belts, guided by tangential fixation lines (the medieval town wall, transformed to inner-city ring and highway ring), and a radial middle fringe-belt. The individual elements (spokes) of the radial mfb can be divided in two main categories: firstly a radial pattern of big fringe-belt land-use aligned to inherited industrial arterial infrastructure and the Dommel river valley. The second category is a radial structure of inherited rural perimeter blocks defined by the pre-industrial regional street system. These fringe-belts refer to three shifts in the patterns of urban growth. The first fringe-belt developed during the long period of stagnation of urban growth between the middle ages and the period of early industrialization. The second developed between the 1920's and 1950, when the growth pattern shifted from uncontrolled parasite development to radial-axial urban expansion. The last fringe-belt developed during the 1970's, when the radial-axial pattern shifted to concentric outward urban expansion.

Eindhoven's radial fringe-belt, the case of Gestel

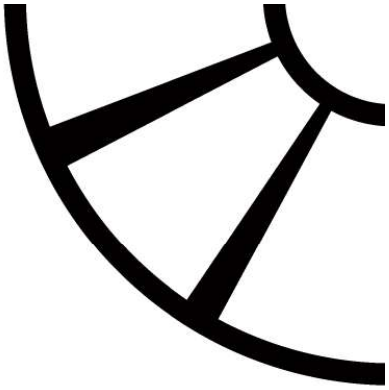
Gestel borders the canal of the central town of Eindhoven and stretches in length over about 8 kilometers to the march in southwest direction. The width of the area is clearly delineated by two parallel streams: the *Dommel* in the southeast and approximately 1 kilometer to the northwest, the *Gender*. This specific form of the area creates one typical areal section of two parallel stream valleys centered by a sand ridge (Fig. 3a).

The road network, as showed by the military topographical map of 1830-1850, is built up of three hierarchical layers. The primary layer consists of a central main road (Hoogstraat) which runs along ridge at high altitude. When the Hoogstraat crosses the stream *De Rundgraaf* towards the central town Eindhoven, it splits in two equal branches, diverging until they both bridge the Eindhoven town canal and connect to the internal network of the central town. The Hoogstraat is part of a supra-local network which connects several villages to the town centre. At a local level, the axis mirrors the good soil conditions along the road which resulted in the symmetrical development of human settlement. This indicates that the Hoogstraat also serves on a secondary level.

On this secondary and the tertiary level the network represents the operational structure of the local agricultural system of the municipality of Gestel. Secondary roads branch off from the Hoogstraat and slightly move away from the axis to converge again within a certain distance. The width of the intervening area constantly varies as a result of the organic meander of both the main and the secondary roads. At the north side of the ridge, the secondary road (Goorstraat and Laagstraat) clearly delineates the border between the higher stretches of land and the lower swampy stream valleys. The road provides access to the lower meadowland and grazing land, and opens up the parcels of farm land adjacent to the back of the premises along the main road. The southern part of Gestel shows a different pattern. On this side the higher grounds used as farmlands stretch out over quite a larger measure and the change from farmland to grazing land is not defined by a secondary backroad. The southern backstreets (Gestelse straat and Bennekelstraat) cut through the farmland which results in a symmetrical profile of high quality grounds on both sides of the street. Near the village centre of Gestel, a secondary street, linking Gestel to Gennep, is connected square to the southern backstreet, from southward direction.

On both sides, north as well as south, of the Hoogstraat, the fields between the primary

Figure 4. Model representing the Eindhoven fringe belts. Derived from Whitehand's fringe-belt model



and secondary parts of the network are subdivided into proto-urban street-blocks by tertiary connection streets, situated square with the main direction of the network. Some tertiary streets give access to the lower meadowland and grazing land. Those streets end with an open connection to the fields.

Over the length of the territory four zones can be distinguished (Fig. 3a). The distinction rests on the interpretation of how different settlement patterns crystalized on the pre-existing network. The Map shows slow gradual change, as well as more abrupt breaks in the physical and functional coherence. The first zone is the extramural area of the municipality of Eindhoven, *De Bergen*. This area is bordered by the IFB fixation-line of the town canal on one side, and on the other side the stream *De Rundgraaf*, which serves as administrative border between the municipalities of Gestel and Eindhoven. The street network forms one large triangular block. Patterns of settlement developed along both sides of the roads, which reveals a contrast in development potential between the plots within the street block and the plots across, with their tails in open connection to the fields. The map of Van Deventer of 1565 illustrates the dense developments in this area, also confirmed by the cadastral map of 1832. The second zone runs to the edge of the built up area of the village centre of Gestel. Notably there is an abrupt change to a middle dense pattern of relatively equally distributed two store houses and farmhouses along the central road. No patterns of building settlement are to be observed along the secondary backstreets and tertiary connections in this zone. The village centre of Gestel is the third zone, defined morphologically by the presence of rural-urban street-blocks, mixed building type development along the secondary backstreets and a large institutional block, which accommodates a church with a small cemetery, a patronage building, a convent and two schools. The fourth zone of the Gestel ridge is a peripheral transition zone. This zone shows a gradual decline in the density of ribbon development in outward direction.

In the next period of early industrialization (Fig. 3b), the topographical maps of 1912 and 1929 express an increasing pressure to accommodate housing for the industrial workers in Gestel. However, the result is not the formation of a compact urban fabric. On the contrary, the pattern of settlement development along the street network shows even an increase of the initial diffuse relationship between the urban core and the countryside. The absence of any centrally imposed town-planning regulations leads to a proliferation of ad-hoc developments. No densification but a diffuse expansion of low-dense rural-urban fabric, parasitizing to the pre-existing rural street network.

Remarkable changes in the town-plan of Gestel are the densification of the settlement pattern along the primary street and further developments along secondary and tertiary parts. Few industrial companies establish in Gestel, a steam tramline is constructed within the profile of the Hoogstraat and a new industrial railway crosses the second zone of the area. In this part the morphological transformation is the most intensive. The

new railway cuts through the area and divides the second zone in four quarters (Fig. 3b). The first, northwest quarter is strictly bounded by the lower meadowland in the north and the railway in the east, and has an open connection with the centre of the village Gestel. The intensity of new developments in this quarter is low. In contrast, urbanization of the second quarter, northeast of the railway and bounded by the municipal border of Eindhoven, is vast. This is caused by locational advantages of low tax and relatively low land prices in combination with the immediate vicinity of the industrial centre of Eindhoven (Beekman, 1982). Centripetal forces drive the development of the second quarter and the railway functions as a fixation line.

The southern part of the area, again, shows a different pattern of development. Here the railway doesn't cause strong contrasts in intensity of transformation like in the northern parts, but remarkable is the emergence of new urban typologies in the form of small plan-units along the southern secondary backstreet, the Gestelse straat. The seemingly chance position of the ensembles along the street refers to the relative unification of locational factors for housing development and to the absence of regulations. However, the location of these new typologies in the quarter adjacent to the border of Eindhoven indicates a soft manifestation of centripetal urban forces.

The topographical map of 1949 indicates a further development of centripetal urban forces during the industrial heydays of Eindhoven (Fig. 3c). Its first representation is a final climax of parasite development on the pre-urban network structure of Gestel. Compared to the previous period, the biggest difference is the building-up of also the secondary and tertiary parts of the network, in addition to transformations along the primary Hoogstraat. The process leads to the formation of oversized perimeter street-blocks of irregular shapes. Typo-morphological characteristics are the strong contrast between a densely developed perimeter and the relative empty inside where a rural character sustains, the diversity in building typology, plot shape and size, and the fine differentiation of land ownership.

Secondly, the increasing influence of town-planning regulations is represented in the formation of two planned neighbourhoods in the southern part of the area of Gestel: the Schrijversbuurt, adjacent to the town centre of Eindhoven, and the neighbourhood Bennekel, situated on cheaper peripheral land near the old centre of Gestel (Fig. 3c). An interesting fact is that both plans represent the extremes of urban core-periphery dynamics of that time. While the Schrijversbuurt responds to the strategic planning ambitions to create a coherent compact town-plan, the Bennekel is a pragmatic and desperate answer from the municipal authority on the housing shortage during the economic downturn of the thirties.

While the geographical position of the two neighbourhoods is definitely a representative of concentric dynamics, their position towards the Hoogstraat, indicates that the street network persists in its role as a backbone for urban development. The designed plan structures are grafted on to the existing network in order to disclose a second order, directly behind the organically shaped plan-units of the parasite ribbon development structure. Remarkable is the fact that the inconsistency between the morphological systems of the two plan-units are absorbed by a new type of intermediating street-blocks, with their individual plot configuration, and not by the form of the public space. This illustrates the marginal role of the planning authority in the period. So two categories of irregular shaped blocks have emerged in the area of Gestel: parasite blocks of the pre-planning period and the pragmatic blocks of the second order (connection blocks), which absorb the spatial inconsistency between the two morphological sys¬tems (unplanned and small planned patches). The spatial distribution this small taxonomy along the Hoogstraat forms a morphological corridor of encapsulated peripheral space. This is the radial fringe-belt (Fig. 3c). New extensive land-use functions find a place within this fringe and existing peripheral functions can expand. The inside of the blocks is the domain of private parties.

During the late industrial period the fringe tissue shows a great ability to adapt to new functions. But although fringe-belt transformations occur under the relative lee of post war urban reconstruction, which is inextricably bound up with the physical interpretation of the town's new regional position (topographical maps of 1963 and 1973), fragmenta-

tion of the morphological structure of the radial fringe-belt leads to abrupt divisions of the former unity of location factors, such as accessibility and land price (Fig. 3d).

The construction of two new urban elements have a huge impact on the area of Gestel. Firstly, the tangent road (Rondweg), which has been allocated to cross the area through the low dense developed first quarter of the second zone, thereby reducing costs of building demolishment and major land use relocation. The moment of realization is consciously chosen in a period of economic downturn (Beekman, 1982). Consequential transformation of the cadastral configuration of the area, leads to new plot potentials. New functions like offices of the new emerging service economy, regional education institutes, a car showroom, care institutions, some pushed out of the town centre, seeking for space and good accessibility, establish on the vacant plots. This process refers to Conzen's description of the final phase of fringe-belt development. And once this occurs it becomes the space for additional city-centre functions (Dollen, 1990). The interruption of the continuous structure of the radial fringe-belt by the Rondweg resulted in a separation of transformation patterns. In this context the Rondweg can be defined as physical limitation, a fixation line, of not urban growth, but of urban transformation.

Secondly, a new arterial road (Karel de Grotelaan) is realized to relieve the old radial axis of increasing traffic load. The road is embedded within a larger patch which in one go fills in the northern part of the area. Until then this marshy territory had remained unbuilt. The new built area relies on the amenities of the old ribbon the Hoogstraat and the radial fringe-belt. In this new context the elastic character (Scheer, 2001) of the fringe-belt tissue proves its ability and quality to facilitate the quantitative and qualitative morphological and geographical demands of the expanding and modernizing city.

The topographical map 1984 expresses a pattern of concentric expansion, leapfrogging over the canal zone, which has developed as a peripheral park zone after the canal stopped being used. New suburban neighbourhoods fill the area to the highway (Fig. 3e).

The radial fringe-belt is totally embedded within several planned districts originating from different time periods. The geographical positions of those neighbourhoods do not only follow the traditional concept of city-growth in rings, except for the last expansion, but the concentric order is combined with an axial order, structured by the main axis, the Hoogstraat. This unique mixed geography is the result of the continuous interplay of central forces and a persisting tendency of unification of location factors, as well as, the mediating role of the Hoogstraat as a backbone of urban development. The urban transformation processes of the radial fringe-belt continue to follow this characteristic mixed dynamics. Some transformations are clearly driven by centripetal forces, like gentrification processes in the more central part, others are more product of varied urban processes, mixed up with diffuse, and peripheral processes.

Conclusion

The morphological constitution of the radial fringe-belt of Eindhoven came to development during the two pre-war episodes of industrial development. Its structure is not to be understood as a simple superposition of plan elements, but rather as a complex and selective accumulation of spatial patterns developed over different time periods and some changes have confirmed to be rather cyclic. The base structure is also deeply interwoven with the geomorphological context and with cultural, political and economic factors and processes. This research confirms that to explain and understand the logic of the contemporary townscape from a morphogenetic research point of view is most useful and complementary (Conzen, 1960), though, when the methodology of the town plan analysis is supplemented with detailed analysis of real-time plot configuration evolution.

The form of growth of the city of Eindhoven has been analysed and subsequently three categories of fringe-belts have been defined: the inner fringe-belt (IFB) enclosing the city core, the radial middle fringe-belt (MFB), and the outer fringe-belt (OFB). When assembling the radial MFB between the two concentric fringe-belts (IFB and OFB) in a concluding model, interesting patterns emerge (fig. 4). As the radial MFB links the IFB to the OFB, the total fringe-belt structure forms one coherent whole, without merging the

individual morphological characteristics and relationships with the rest of the city. Recognition of this model in the form of an urban landscape management plan could benefit not just the tourist potential of the place, but also the residents' sense of tradition and continuity (Gu, 2010; Kolen 2007; Bosma and Kolen, 2010).

The form of growth of Eindhoven during its industrial periods, resulted in a radial-axial pattern of distribution of morphological properties. This typical pattern discriminates between the processing of general shifts in urban economic geography of other city types according to their form of growth and to the form of their fringe-belts.

The morphological structure of the radial fringe-belt consists of large, irregularly shaped street-blocks: 'parasite blocks' and 'pragmatic connection blocks'. The specific morphological structure of the radial fringe-belt itself creates a framework of physical inertia which locks inn, determines and sustains the elastic nature of its own typical transformation processes. The old arterial road, which lines up the spatial distribution of the fringe blocks, provides accessibility for each block and, on the long run, an equal development potential. This isotropic condition epitomizes the intrinsic development logic of the radial fringe-belt.

Finally, the concept of the fixation line can be applied in research, planning and design of the contemporary urban field. For example in the case of the Eindhoven Rondweg, crossing the Gestel radial fringe-belt corridor: activation of this fixation line can generate intramural and extramural redevelopment of the radial fringe-belt fabric.

References

Beekman, P. (1982) Eindhoven, stadsontwikkeling 1900-1960 (author, Mierlo).
Boeri, S. (1999) 'Eclectic atlasses; four possible ways of seeing the city', Diadalos 69/70, 102-13.
Bosma, K. (2003) *J. M. de Casseres; De eerste planoloog* (010 Publishers, Rotterdam).
Conzen, M. R. G. (1960), Alnwick, Northumberland; a study in town-plan analysis (George Philip Londen).
Conzen, M. P. (2009) 'How cities internalize their former urban fringes: a cross-cultural comparison', *Urban Morphology* 13(1), 29-54.
Corboz, A. (1983) 'The Land as Palimpsest', *Diogenes* 31, 12-34.
Dehaene, M., Loopmans, M. (2003) 'De argeloze transformatie naar een diffuse stad: Vlaanderen als nevelstad', *Agora* 19(3), p. 4-6.
Dollen, von der, B. 1990) 'An historico-geographical perspective on urban fringe-belt phenomena', in Slater, T. R. (ed.) *The built form of western cities* (Leicester University Press, Londen) 319-348.
Fishman, R. (2005) 'Longer View: The Fifth Migration', *Journal of the American Planning Association* 71(4), 357-366.
Foot, J. (2000) 'The urban periphery, myth and reality. Milan 1950 – 2000', City, 4(1), p. 7-26.
Gospodini, A. (2006) 'Portraying, classifying and understanding the emerging landscapes in the post-industrial city', *Cities*, 23(5), p. 311-330.
Gu, K. (2010) 'Exploring the fringe belt concept in Auckland: An morphological idea and planning practice', *New Zealand Geographer* 66, 44-60.
Indovina, F. (1991) L*a città diffusa* (DAEST, Venezia).
Kolen, J., Bosma, K. and Renes, H. (2010) 'De landschapsbiografie: instrument voor onderzoek, planning en ontwerp', in Koolen, J., Bosma, K. (ed.) *Geschiedenis en ontwerp; Handboek voor de omgang met cultureel erfgoed* (Van Tilt, Nijmegen) 212-237.
Kolen, J. (2007) 'Het historisch weefsel; Over de transformatie van de regio en de omgang met het verleden in de 21ste eeuw', in Rodermond, J. *Perspectief; Maakbare* geschiedenis (Stimuleringsfonds voor architectuur, Rotterdam) 46-77.
Läpple, D. (2009) 'Diversity of urbanization patterns in a global world', in Rieniets, T., Sigler, J., Christiaanse, K. (ed.) *Open city: Designing coexistence* (Sun, Amsterdam) 157-166.
Levy, A. (1999) 'Urban Morphology and the problem of the modern urban fabric: some questions for research', *Urban Morphology* 2, 79-85.
Loeckx, A., Meulder, de, B. (2003) 'Wonen op zoek naar stedelijkheid, dichtheid en du-

urzaamheid. Debatten, realiteiten, perspectieven', in *De eeuw van de stad, over stadsrepublieken en rastersteden, voorstudies,* 273-304.
Meulder, de, B. (2008) 'Old Dispersions and Scenes for the Production of Public Space The Constructive Margins of Secondarity', *Architectural Design* 78(1), p. 28-33.
Moudon, A. V. (1997) 'Urban Morphology as an emerging interdisciplinary field', *Urban Morphology* 1, 3-10.
Norton, W. (1982) 'Historical geography as the evolution of spatial form', in Baker, A. R. H. and Billinge, M. (ed.) *Period and place. Research methods in historical geography* (Cambridge University Press, London) 251-260.
Oorschot, van, J. M. P. (1982) *Eindhoven, een samenleving in verandering* (author, Gemeente Eindhoven, Eindhoven).
Reijndorp, A. (1991) 'De stad Eindhoven belicht; wie licht spreidt, spreidt gezelligheid', in Verstegen, T. (ed.) *Verkenningen in de ruimte; vijf beschouwingen over stadbeeld Eindhoven* (Gemeente Eindhoven, Eindhoven) 21-32.
Rutgers, R. (2005) *Morfologische Atlas Eindhoven* (Gemeente Eindhoven, Eindhoven) CD-Rom.
Scheer, B. C. (2001) 'The anatomy of sprawl', *Places* 14(2), 28-37.
Secchi, B. (2007) 'Rethinking and Redesigning the Urban Landscape', *Places* 19(1), 6-11.
Verstegen, T. (1999) *Stadbeeld Eindhoven visies en verhalen* (Nai, Rotterdam).
Vilagrasa, J. (1990) 'The fringe-belt concept in a Spanish context: the case of Lleida', in Slater, T. R. (ed.) *The built form of western cities* (Leicester University Press, Londen) 300-318.
Wagenaar, C. (2011) *Town planning in the Netherlands since 1800* (010 Publishers, Rotterdam).
Whitehand, J. W. R. (1981) 'Background to the urban morphogenetic tradition', in Whitehand, J. W. R. (ed.) *The urban landscape: historical development and management Institute of British Geographers Special Publication* 13 (Academic Press, London) 1-24.
Whitehand, J. W. R. (1988) 'Urban fringe belts: Development of an idea', *Planning Perspectives* 3:1, 47-58.

Morphology of the urban organism in Cyprus. The effect of borders and political changes in the fringe belts of Girne, TRNC

Alessandro Camiz, Alessandro Bruccoleri
Girne American University, Faculty of Architecture, Design & Fine Arts, Department of Architecture, Girne, TRNC.
Keywords: Kyrenia, fringe belts, urban growth, urban design, urban morphology

Abstract

The contemporary city is developing inside and outside the limits of administrative territorial entities, and sometimes the urban organism is out of the control of local town planning. Nevertheless city limits, within the formation process of urban tissues, develop through time changing status from dividing limits to centralizing areas (Caniggia and Maffei, 1979), (Strappa, 1995). The notion of "fringe belt", as developed by M.R.G. Conzen and the school of urban morphology of the University of Birmingham (Conzen, 1960), (Whitehand and Morton, 2004), describes coherently the change of status of these areas. This paper analyses the formation and change of fringe belts in the city of Girne, TRNC (Kyrenia, Cyprus). The case study of Girne, TRNC, as developed after 1974, is an interesting example of change in urban growth within a different State and local authority which enhances the open fringe belt formation, as happens in most metropolitan areas, determining a scattered and unplanned urban growth. The post 1974 changes of the fringe belts of this city will contribute to the further comprehension of urban policies used in the Turkish Republic of Northern Cyprus after the division of the island following the Turkish military occupation. The case study of Girne (Kyrenia) will be also useful for the discussion and the comparative analysis of post 1974 urban growth of cities in the south side of Cyprus (Charalambous and Hadjichristos 2011), following the latest trends of the research in urban morphology (Gu and Xu 2014) to understand the different land use policies, the property issue, the contemporary urban planning policies and the future urban design strategies in Cyprus.

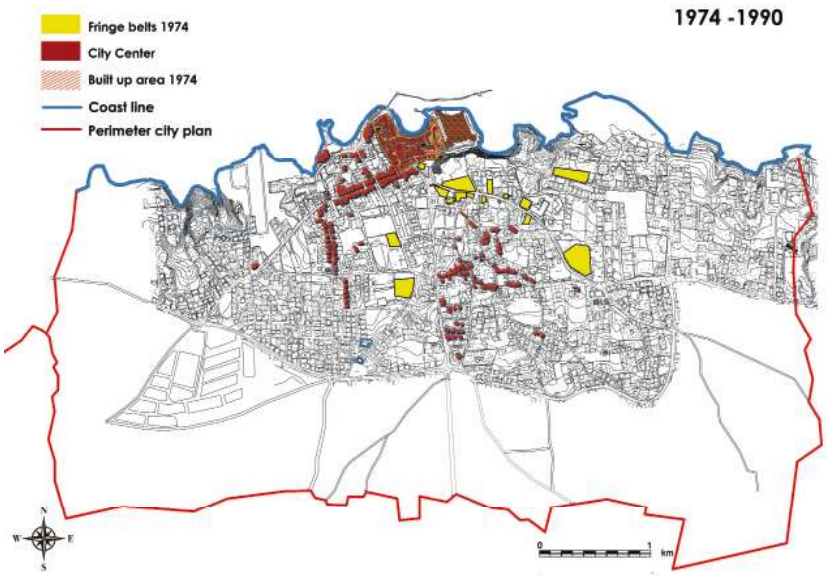
Introduction

The contemporary city is developing nowadays as an unplanned organism, sometimes inside and sometimes outside the limits of administrative territorial entities, so it does happen quite often that the urban organism goes out of the control of the local town-planning authority. Nevertheless the city limits, within the formation process of urban tissues, develop through time changing status from dividing limits to centralizing areas (Caniggia and Maffei, 1979), (Strappa, 1995). The notion of "fringe belt", as developed by M.R.G. Conzen and the school of urban morphology of the University of Birmingham (Conzen, 1960), (Whitehand and Morton, 2004), describes coherently the change of status of these areas. This paper analyses the formation and change of the fringe belts in the city of Girne, TRNC (Kyrenia, Cyprus). The case study of Girne, TRNC, as developed after 1974, is an interesting example of abrupt change in the urban growth pattern within a different State and local authority, a change usually enhancing the open fringe belt formation, as happens in most metropolitan areas, determining a scattered and unplanned urban growth. The post 1974 changes of Kyrenia's fringe belts will contribute to the further comprehension of urban policies used in the Turkish Republic of Northern Cyprus after the division of the island following the Turkish military occupation in 1974. The Girne (Kyrenia) case study will be very useful for the discussion and the comparative analysis of the post-1974 urban growth in Cyprus, (Charalambous and Hadjichristos, 2011). The case study will also, following the latest trends of the research in urban morphology (Gu and Xu 2014), describe the different land-use policies, the property issues, the contemporary urban planning policies and the possible future urban design strategies in Cyprus.

The third largest island in the Mediterranean, Cyprus, has a strong growth in terms of tourism and economic interests and real estate, Northern Cyprus, the territory occupied by the Turkish army following the civil war, after the regime change in 1974 developed a rudimentary foreign policy to explain the communal perspective on the island's political difficulties. Two factors constrained the development of Turkish Cypriot foreign policy. First, Turkish Cypriots lacked the personnel and resources to project themselves on the world scene. Second, Turkish Cypriot administrations lacked international recognition and were dependent on Turkey's acting as an intermediary. The situation changed gradually after 1985, although Turkish Cypriot activism in foreign policy focused on expanding trade and political contact, rather than on the settlement process. International attention would help a Cyprus settlement. After 1974, the Turkish contribution to the Turkish Cypriot budget was estimated at 80 percent, but by 1990 that subsidy was reported to be in the 30 to 40 percent range. The opposition press in Turkey occasionally complained about aid and assistance to northern Cyprus. For their part, Turkish Cypriots complained of inadequate aid, the failure as of late 1990 to establish a customs union, and the importation of Turkey's economic problems, most notably rampant inflation in the late 1970s and again in the late 1980s. Relations were also strained by social differences between Turkish settlers and the higher levels of education and more urban and secular lifestyles of most Turkish Cypriots. Much needed foreign exchange would be supplied by university students and tourists, both groups primarily from Turkey. Northern Cyprus, with a population of 300,000, currently operating nine universities and a 10th coming up soon, according to the Higher Education Council, or Yodak, the government body charged with overseeing them. A total of 63,000 students are enrolled in these universities, of whom only 13,000, about 20 percent, are Turkish Cypriots. An additional 35,000 are from Turkey, and 15,000 international students come mainly from countries in Africa, the Middle East and Central Asia (www.devplan.org).

Without a resolution or accession, Turkish Cypriots would have no alternative but to accept further integration with Turkey. The invasion force, which consisted of about 40,000 soldiers and 200 tanks, subsequently was reduced to a garrison of 17,000 troops. The strong presence of military bases is an important factor in the expansion of cities in Cyprus. The areas around the two important cities of the TRNC, Famagusta and the capital Nicosia, developed without a plan, with no respect of the context and without new essential services. Many parts of these towns and cities do not follow a master plan indicating a regular grid or a standardized series of residential plots. This is particularly true

Figure 1. Map showing the fringe belt of Kyrenia 1974-1990

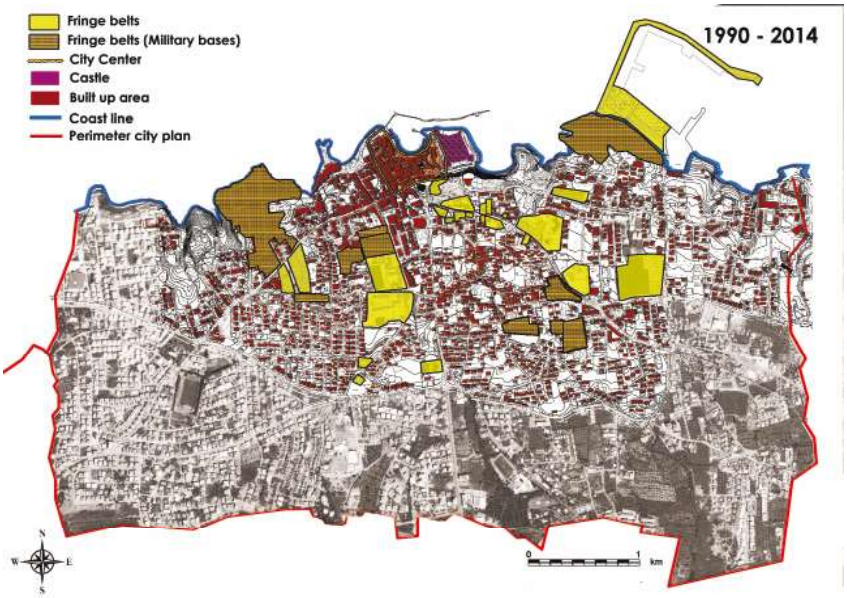


in their fringe belts. The percentage of mass housing developments constructed during the last 50 years was before 1960, 19% (British period), between 1960 – 83, 25 % (Cyprus republic period), after 1983 increased until 55.7% (Turkish federation).

Methodology

Kyrenia's geographical position is on the northern coast and flanked by a tall mountain ridge (Pentadaktylos).The city includes the Castle dating back to 1191 referring to Richard Lionheart's campaign in the area. It is thought that the castle may have been constructed in around VII AD, although there is no recorded exact date of construction. The architectural style and materials of the old buildings surrounding the harbor and the city center, shows the different characters inherited from different cultures from the Greeks, Romans, Lusignans, Venetians and then the Ottomans. The traditional Cypriot settlements reveal a cohesive character with well-scaled narrow streets and cul-de-sacs and organic open public spaces at the intersection of streets and the houses are simple in size and architectural details, most of them are courtyard houses. It generally exerts a sense of complexity, because one is confronted with an unexpected opening and closing; this creates a dynamic urban pattern and a positive orientation in the area. Width of streets is changeable. In some sections the passageways are so narrow that the visual continuity is broken and the space is well suited for social interaction. The buildings are usually not more than three stories high and horizontal lines are dominant on facades as in traditional Turkish houses. Kyrenia, presents a number of problems for researchers familiar to urban morphology and that have ventured outside the European countries. Through an analysis of urban morphology that grows over time the research will come to study the fringe belts that have characterized the city of Kyrenia, highlighting the various stages of the development of the urban fabric in the last 40 years. Conzenian urban morphology can help the understanding of urban landscapes in the current era of concern for urban conservation and landscape management (Whitehand, 2005). The application of M.R.G. Conzen's research method on urban morphology, showed the need to update the geographic method in the period of upheavals of the city, caused by changes in production and economic-social factors following the second industrial revolution. Another interesting effect about the urban fabric is the Old Turkish Quarter built outside the historical center. This part of the city was built after the Ottoman rule around the 17th Century and is now protected as the historical center of the Town.

Figure 2. Map showing the fringe belts in Kyrenia 1990-2014



The general Urban Plan of Kyrenia (Girne Beyaz Bolge) is following the cadastral mapping, performed by the British administration in 1918 ca. and revised in 1930s. The division of the territory is in five regions (Nicosia, Kyrenia, Famagusta, Guzelyurt and Karpaz) and plans are in scale to 125,000 and 25,000 for the districts and the sub-areas.

The United Kingdom designed plots during the acquisition of Cyprus in 1878, recognized as a colony after the First World War. Shape of the plots approaches the cadastral structure described by Conzen in Alnwick, they are following the streets, and head of the lot contains the main building, while the back is occupied by the court or garden and often hosts service buildings or accessories. There are two cadastral maps designed by British administration, the first one describes the urban fabric in 1918, and the second one shows the design of the expansion of Kyrenia after 1930, both of them are scaled in 1:500. The newer districts of the town do not seem to follow either a logical development system or a locally appropriate urban pattern. They are totally different in their urban character, and the residential buildings in these areas are modern concrete-frame slabs and construction isolated on their individual plots. Important presence are the military bases which are breaking the continuity of the urban fabric, they are located next to the centre, and along the seaside. Local identity is lacking, even the new square of the municipality or the monument square which are the two nodal, polar squares of Kyrenia right now, Ramadan Cemil Meydanı and the square next to the Dome Hotel. Both squares lack three-dimensional qualities; the major node serves as a traffic roundabout only, and the other square, despite its potential of being a lively gateway to the harbor area and a 'place to visit', reveals a very artificial image and cannot attract people at all. In addition, green elements that are characteristic to the region are not valued; there is no clear identity in the newly developed quarters and their negative features greatly endanger the identity and local values of Girne.

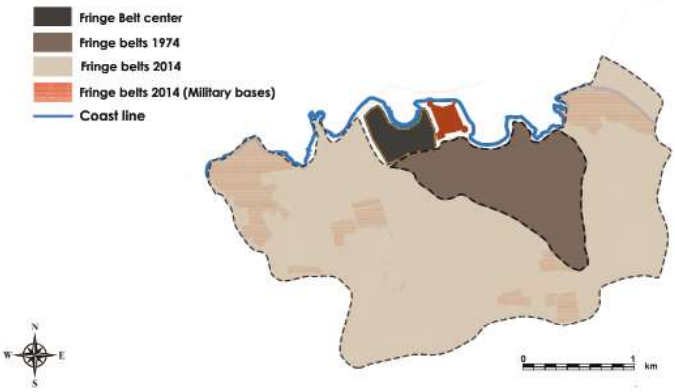
Formation process

This investigation is an attempt to explain the present structure of a town plan by examining its development. Instead of working backwards from present's confused picture, our morphological analysis has followed the growth of the plan. In this way it has been possible to obtain a clearer conception of how the plan has become the cumulative result of a diverse process which kept going by successive functional impulses within the broad scheme of morphological periods. The theory of plan analysis developed here opens a wide field of

research in two directions: in the first place it needs to be connected with a full investigation of the associated patterns of land use and building types in order to produce a complete interpretation of the townscape, secondly, it should be extended to cover different functional types of towns, as well as towns of different cultural areas. Through the theory of urban fringes subsequent growth stages are recognized, as if they were the rings in a tree, every new phase seems exclusively represented by buildings of its relevance only in the outer parts which are growths constituting the contemporary. Fringe belt, a critical reading that coincides with the draft of the transformations of the contemporary city and that indicates a process operating and confrontational, which allows interpreting, choosing and drawing in continuity with the great flow transformation of the city in its history. Historical urban process and landscape allows you to understand the morphologically marginal urban areas of each phase of development, the growth of which is changeable and read according to changes positioned in the economic and social realm. The aim is to decode the structure of the suburbs, beyond their apparent chaos. The fringe belts, therefore, manifest fully their characters during the long periods of stasis in urban development, when the low value of land is associated with the reduced population density (Whitehand, 1998). Factors identified in the structure of peri-urban agricultural areas, the widespread presence of building specialized tertiary and a broad network of routes, along with elements that allow identifying the different scales the "typical behavior" of fringe belts. Most cartographical and statistical data on Kyrenia have already been gathered as this project benefits from previous research on the city. Nevertheless, some complementary data should be gathered. For example, the historical geographical approach will require complementary data on building heights and uses; the process typological approach will need information (from the local authority and the historical archive of the city) on building plans, façades and sections; and the spatial analysis will require data on population and employment (as the drivers of change). No complementary data are needed for the space syntax work. The application of this approach will focus on the concept of the morphological region. A typological analysis of existing buildings in relation to existing data, should enable the identification of the main building developments in this area. Axial analysis and segment analysis will be developed to explore the configurational characteristics of the streets included in the case study. This will focus on the concept of cell using a cellular automata model to analyze this area of the city. The application of the four morphological approaches to one area will help us to understand the main strengths and limitations of each approach and the most effective ways to combine them to better explain and prescribe the physical forms of cities.

Like a number of coastal settlements in the Eastern Mediterranean, Kyrenia began to grow rapidly in the late-nineteenth century. The resultant type of urban environment is very common in Mediterranean Europe (Vilagrasa, 1990). Illegal housing was mostly located on agricultural land near to the built-up area. It was deficient in infrastructure, services and accessibility to the city centre. Small houses were converted to family houses as the population increased and economic conditions improved, and eventually these areas were legalized by official urban plans (Ünlü, T. 2012). There have been various attempts to classify fringe-belt studies. Whitehand (1981) grouped such studies into three categories according to the ideas they developed and the approach they adopted. In a further study, he updated this categorization in terms of a schematic genealogy, taking account of the different cultural contexts (Whitehand, 1988). The present study explores the evolution of urban forms, whose features are the subject of public policies and development strategies regarding the input vector that has prompted the expansion of the city, as well as its management of open spaces (Whitehand, 2003). The fringe belts are commonly fragmented spaces, but they can, in some cases, form a system, as they are usually structured by fixation lines and axes, such as roads, rivers, hills and mountains. Urban Morphology methods have been used to develop research considering the urban form as a product of the action of political, social, and economic forces, as set forth by public policies (Macedo, 1998). Fringe belt concepts have been used to guide research on open spaces and to set up their evolution process in an attempt to identify them within an urban framework. M. R. G. Conzen (1960, 1962, 1969, and 1978) identified the characteristic features of inner fringe belts within towns and cities of medieval origin.

Figure 3. Map showing the overlapped fringe belts areas in Kyrenia



A recurrent feature was the medieval wall and fortification zone, which acted as what Conzen termed as a fixation line. In due course, it was often followed by a ring road. The associated inner fringe belt was divided by Conzen into an intramural and extramural. He termed this type of fringe belt a 'closed fringe belt' (Conzen, 1969) since it was completely closed off from the present urban fringe by subsequent zones of residential and other developments.

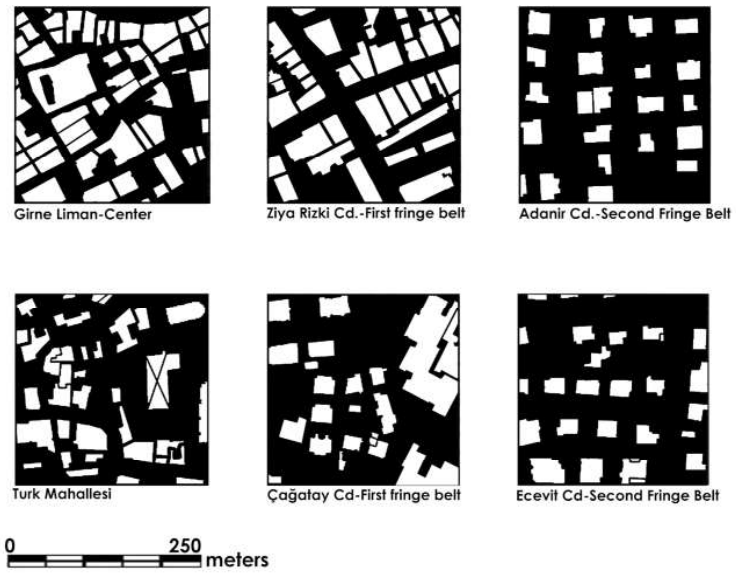
The Inner Fringe Belt with its ancient fixation line and consequent ring road represents a separate major plan type, forming an uninterrupted zone round the Ancient Borough. It shows great irregularity in structure and outline because of its peculiar mode of evolution (Conzen 1960). It owes its individuality as a plan type as well as its areal coherence to the grouping of its plots and their dominants along the consequent ring road, and to the contrast it provides with the more homogeneous plan types on either side. Indeed, heterogeneity is one of its main features, notably as regards plot sizes and types as well as their grouping. This enables several sub-types to be distinguished from the rest. (Conzen 1960)

The presence of a fixation line is a factor in fringe-belt development: any linear feature (such as town walls, topographical features, rivers, railways, boulevards, ring roads and green belt) restricts outward growth and is likely to detective fringe-belt formation. Nineteenth-century maps reveal the burgeoning of institutions outside the town walls. Most of them are religious, but there are also a few health and military institutions. These zones form today's inner fringe belts. The middle fringe-belts mostly developed along the new railways and outside the boulevards.

The fringe belts are determined by the perimeter around the buildings, even if fragmented are attributable to a continuous. Outside the city limits of which are determined although fragmented was continuous and it is their processuality to determine the continuity.

For the analysis of the urban fringe belts found in Kyrenia, two periods were established: 1974-1990 (Fig. 1); 2004-2010 (Fig. 2). The first period is characterized by the first urban expansions, in that time the situation was stable and under the British Empire. The development was along the main streets tangents to the historical centre which is based on the harbor. In the last periods, started the Turkish regime and there was a transition of the economy and the development of the military bases and the sprawl of the city, in downtown as well as in adjacent areas. 1st phase – 1974-1990 (fig. 1): the urban fringe belts are generating on the main street and have different sizes on the representation. They are resultant of peripheral uses of the initial plan fully implanted. 2nd phase - 2004-2010 (fig. 2): the urban fringe belts due to zoning are concentrated on the east and the west. The institutional urban fringe belts can be seen in more distant neighborhoods from the urban area in consolidation. The urban fringe belts suggested then, together, comprehend what could be call external urban fringe belts, according to the concept of M.R.G. Conzen. As we focus on the analysis on the size of urban fringe belts, we are able to notice that their greater incidence is on the east portion on Mustafa Çağatay Street, as well as on west and part of southern.

Figure 4. Comparation of examples of urban tissues from the different fringe belts of Kyrenia (1974-2014)



It is also clear that the urban fringe belts have randomly surrounded the central initial nucleus in every expansion period and are noticed as the urban equipments move away from the central area.

Geographers, architects and planners study these belts to seek practical applications as possible elements of urban planning and practices. Architects consider that the identification of fringe belts as elements of the dynamics of urban growth could collaborate for the development of urban policies in an attempt to use these belts as potential areas to be added to open space systems. The identification of fringe belts could be incorporated into land use laws so as to become legal instruments to guarantee the conservation of fringe belts and open spaces within the city. Fringe belts can also be incorporated into open spaces within the city and contribute to establishing a system capable of absorbing impacts caused by human actions. In an attempt to maintain the structure of this system, based on a theoretical and methodological basis of landscape ecology (Forman and Godron, 1986), the assessment of open spaces and fringe belts allows for the creation of potential ecological structures within the city. The landscape ecological planning can also contribute to the creation of a spatial solution capable of handling transformations of landscape elements, in an attempt to render human actions compatible with the capacity of ecosystems to absorb impacts as well as to maintain the integrity of the processes and life cycles (Pellegrino, 2000).

Conclusion

The task of this study is the identification of open spaces and the possible fringe belts of Kyenia, for the present and the future perspectives for planning policies seeking quality and public management. The proposal to use fringe belts within the city serves to generate new measures to improve the identifiable characteristics of open spaces identified within the city.

Methodological procedures used in this research included the identification of public open spaces and the discovery of the existence of a system of open spaces in the city of Kyrenia considered to create a system. As the fringe belts are private spaces with low occupation density, the present study undertook to study these, bearing in mind their possible incorporation into the system of open spaces and the existing axis, which have the function of corridors or greenways. Several studies have been prepared to put this concept into practice, using the English school of urban morphology as a reference, with studies from Conzen, carried out in 1960 (Conzen, 2004 and Whitehand, 1981), as guidelines. Network

is the main characteristic of systems that enables and supports the occurrence of ecological processes and functions. The project to create corridors connecting open spaces and fringe belts may well provide the feasibility for a more sustainable system. The main objective of this work was to improve the system of open spaces to reduce the fragmentation of the landscape elements, through corridors, greenways, and new forms of connection among the existing features, such as integration among urban occupations.

References

Barke, M. (1976) 'Land use succession: a factor in fringe-belt modification', Area 8, 303-6.
Barke, M. (1990) 'Morphogenesis, fringe belts and urban size: an exploratory essay', in Slater, T. R. (ed.) *The built form of Western cities* (Leicester University Press, Leicester) 279-99.
Camiz, A. (2014) Urban Morphology and Architectural Design of City Edges and Vertical Connections in Historical Contexts, in *New Urban Configurations*, Roberto Cavallo, Susanne Komossa, Nicola Marzot, Meta Berghauser Pont, Joran Kuijper (eds.) IOS Press, Amsterdam 2014, pp. 227 – 234.
Camiz, A. (2012), Redesigning suburban public spaces with the transect theory, in *Abitare il nuovo/abitare di nuovo ai tempi della crisi*, M. Bellomo et al. (ed.), Clean, Naples 2012, pp. 111-121
Camiz, A. (2012), 'Urban morphology and fringe belts', *Paesaggio Urbano*, 3, 2014, pp. 94-96.
Caniggia, G. and Maffei, L. (1979), *Lettura dell'edilizia di base,* (Marsilio, Venezia)
Cataldi G. Maffei G.L. Vaccaro P. (2002), Saverio Muratori and the Italian school of planning Typology, *Urban Morphology* 6(1), 3-14
Charalambous, N. and Hadjichristos, C. (2011), 'Overcoming Division in Nicosia's Public Space', *Built Environment*, 13, 170-182.
Conzen, M. P. (2009) 'How cities internalize their former urban fringes: a cross-cultural comparison', *Urban Morphology* 13, 29-54.
Conzen, M.R.G. (1960), *Alnwick, Northumberland: A Study in Town Planning Analysis*, (Institute of British Geographers, Publication no.27, London).
Conzen, M. P., Gu, K. and Whitehand, J. W. R. (2012) 'Comparing traditional urban form in China and Europe: a fringe-belt approach', *Urban Geography* 33, 22-45.
Darin, M. (2000), French belt boulevards, *Urban Morphology* 4 (1), 3-8.
Gu, K. and Xu, Z. (2014), 'Applying Conzenian and Caniggian ideas in China: recent research advances and problems', *Urbanform and design*, 1, 10-21.
Levy, A. (1999), Urban morphology and the problem of the modern urban fabric: some questions for research, *Urban Morphology* 3 (2), 79-85
Strappa, G. (1995), *Unità dell'organismo architettonico*, (Dedalo, Bari).
Ünlü, T. (2012), Thinking about urban fringe belts: a Mediterranean perspective, *Urban Morphology* (2013) 17(1), 5-20
Whitehand, J. W. R. (2001), British urban morphology: the Conzenian tradition. *Urban Morphology, 5*(2), 103-109.
Whitehand, J.W.R. (1978) `Long-term changes in the form of the city centre: the case of redevelopment', *Geografiska Annaler* vol. 60 B pp. 79-96
Whitehand, J.W.R. (2005), 'Urban morphology, urban landscape management and fringe belts', *Urban Design* 93, 19-21
Whitehand, J. W. R., Morton, N. J. (2004) *Urban morphology and planning: the case of fringe belts* (School of Geography, Earth and Environmental Sciences, University of Birmingham, Publicado na Cities, Vol. 21, Nº 4) 275-289
Whitehand, J.W.R. and Morton, N.J. (2003) 'Fringe belts and the recycling of urban land: an academic concept and planning practice', E*nvironment and Planning B: Planning and Design* 30, 819-39.
Whitehand, J.W.R. and Whitehand, S.M. (1983) `The study of physical change in town centres: research procedures and types of change', *Transactions of the Institute of British Geographers NS* vol. 8 no. 4 pp. 483-507
Whitehand, J.W.R. and Morton, N.J. (2004) 'Urban morphology and planning: the case of fringe belts', *Cities*, 21, 275-89.

Fringe belts of the city of Yeniseysk as a resource for the historical renovation

Irina Kukina
Department of Urban Design and Planning, Siberian Federal University, pr. Svobodnyi 79, 660041, Krasnoyarsk, Russia
Keywords: Yeniseysk, fringe belts, urban renovation

Abstract

Yeniseisk is the historical city administrative center of the Yeniseiskaya guberniya (Yeniseisk´s administrative region within the Russian Emperia - in our days Krasnoyarsk Administrative Region) since the end of XVI till beginning of the XX century. Long years it was trade, industrial, religious, educational Siberian core as well as the host of annual Fur Fair, crafts, productions of the golden miners. Now it has status of shrinking town and candidate for the list of UNESCO world heritage. UNESCO committee determined the main problem as the historical panorama loosing. Krasnoyarsk regional administration is searching for the strategy of the organic development using the scientifically based reconstruction of the city historical core as well as it´s fringes. Fringe belts still contain original Siberian samples of unique civil architecture, and more over some traditional industries, gardens, etc. everything that really could be lightly reconstructed for the purposes of the core maintenance including contemporary interventions. Old times, functional processes evidently leaved imprints in the forms of individual house holdings as well. Fribge belts could be considered as an integrating dialectic "sponge" between new and old functions, architecture and new and old forms of urban life "inscribed" into historical and contemporary world.

Introduction

Modern Yeniseysk is woven from the masses of layers and epoch, cultures, and tradition superimposition. In the period of prolonged economic crises it has managed to retain its uniqueness as an object included in the list of the candidate of the UNESCO world heritage sites. Its environment has been established as a manuscript written on a parchment or papyrus on top of washed away or scraped text or as an ancient crater on the icy body, the relief of which has been leveled leaving only a round light spot. According to the law of palimpsest, intervention of modern architecture and construction technologies make the multilayer time 'text" look "transparent". The problem of uniqueness of modern Yeniseysk is getting more acute under global pressure of coming economic reconstruction. Inhabitants and professionals are considerably worried by the "falling economy" and population migration on the one side, and, on the other side, by the possibility of replacing their full way of life in a small town by another reality – tourist streams. Is a new architectural form appropriate here at the expense of its own content loss?

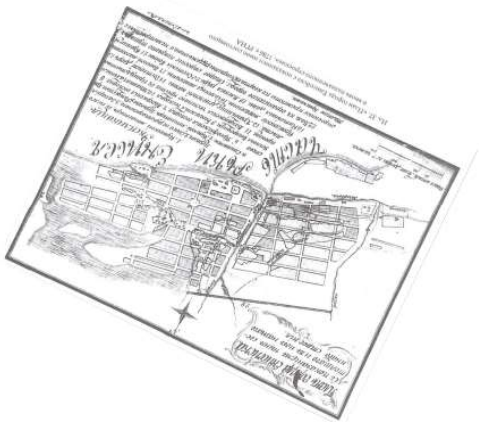
In the opinion of the professional community, renovation should affect all levels of the environment Yeniseysk, including the preservation and restoration of its planning structure. In this regard, the concept of "fringe belts" can be used as a tool to establish the boundaries of the historic areas of the city and territories for the building investments. Studies of modern functional use of the fringes of XVIII centuries allow to formulate their development strategy with the purpose to maintain the structure of the city of the end of XVIII- begging XIX centuries.

Discussion of the fringe-belt concept has hitherto taken place principally in relation to Western cities (see, for example, Conzen, 1960; Whitehand, 1988). Similar thinking about urban fringes and the phenomenon of fringe belts has, however, occurred in relation to Russian cities, and its history merits wider dissemination. Since the 1960s there has been a major change toward the 'historical' approach to large-scale urban reconstruction and urban fringes were associated with a growing interest in the ways in which cities are changing their structures (Lavrov, 1966). There was a series of investigations into the morphogenetic and functional aspects of cities. Terms such as 'urban fabric', 'environment', 'landscape', 'genetic' and 'ecosystem', and others borrowed from the natural sciences, became prominent in urban theory. Researching into, and adopting principles of, biology and geography (including applied landscape geography) became familiar aspects of urban analysis, design and planning. During the 1970s and 1980s ideas relating to landscape unity and heterogeneity, and the nexus of physical, biological and social processes came into urban analysis from the theoretical works of Neef (1967), Solntsev (1960) and Troll (1971). The urban landscape has become of increased interest in the practice of design and building. Town builders understand landscape as a spatial unit – as an integral combination of urban form and landscape form. Issues relating to this were particularly explored in the Central Scientific Institute for City Planning and Urban Design at Moscow State University at the end of the 1970s, and more recently in the work of Tobilevich (1981), Gutsalenko (1984), Kukina (2006) and others. Never the less the relationship between urban morphology, planning and urban design is still poorly developed in the sphere of the renovation of the urban heritage.

Methodology

The mapping of morphological units was part of the historico-morphological and landscape approach to urban structural analysis. Historical successions of forms in the landscape were evidenced in surviving forms. Such investigations in Yeniseysk reveal concentric zones within the city that mark former urban fringes. They are associated with phases of slow outward city growth, related to physical obstacles, such as city walls and natural obstacles (swamps, taiga, steep slopes), and have been leapfrogged during subsequent periods of rapid residential expansion mixed with the craft production, formation of objects of religious authority. These zones have clear affinities to the fringe belts investigated by researchers in the English-speaking world. The fact that these affinities exist despite more than 90 years of private property elimination in Russia suggests the need for a closer inspec-

Figure 1. Plan of the city of Yeniseysk of 1876 year shows fringe belt formed during XVIII century



tion of the relationships between process and form under different types of governance, especially under the contrasting conditions of 'controlled development' and genetically 'natural' town fabric formation. It is evident that even 'controlled development' has not eliminated some fundamental aspects of uncontrolled development. In the case of the city of Yeniseysk, what in the West would be termed 'fringe belts' should be the subject of recommendations to the city authorities for their reconstruction, preservation and future development. They should be declared to be integral part of contemporary town.

Statement of research objectives in terms of building intervention

Reconstruction activities of the Yeniseysk historical development, having considerable potential require serious analytical evaluation.

It is evident that the goal of a comfortable city (and this is one of the constitutional rights of the Russian Federation) is a formation of self-sufficient, economically developed mechanism. Moreover, the historical-cultural aspect becomes a "mental anchor" for the citizens of the town and to a certain extent, a source and driving force of economic development.

In this regard, a question arises: what are the grounds for today's economy of Yeniseysk – a small town with a population of 18 thousand to be optimistic as to the future? If you open the program of social and economic development of Yeniseysk until 2020, adopted by the Yeniseysk Council, you would be surprised at depressive mood of the program.

In spite of the pessimistic position of economists, it is clear that the town needs a town-forming base, which will enable additional injections of funds in the city budget, respectively to finance the reconstruction and restoration of monuments of culture.

The second factor is the legal basis for the reconstruction of the town, expressed in updated planning documentation. In 2007 Yeniseysk was one of the first towns of the Krasnoyarsk territory to have received the new master plan. However, this document had turned old before the completion of the draft city development plan. It did not take into consideration the following factors: the Russian legislation, having been significantly changed, the emergence of a new urban planning code and the revised law "On objects of cultural heritage", new scientific information about the monuments of culture and the contemporary requirements for encouraging an active participation of citizens in the economic development of settlements through sustainable operation of small and medium enterprises.

The paradox of reconstruction of Yeniseysk is that current Russian legislation directly says about the prohibition to set requirements for architectural design of new construction projects, to their internal appearance and engineering and technical equipment except for 2 cases:

- when these objects are placed on specially protected natural territories (in this case the issue is connected with preserved natural landscape),

Figure 2. Master plan of the city of Yeniseysk of 2014 year "keeps" fringe belt of XVIII century without essential development. Fringe belt includes main ensembles of the city: Spassky (male) monastery, Melnichnya river valley with the architectural landmarks, archaeological site of the female monastery, other

Or

- when the new building is located in the protected areas of monuments of culture, in the areas of regulating construction – this situation directly relates to Yeniseysk.

In this connection some issues come into being - on the basis of what research to formulate regulatory requirements for the building regulations of the historic environment? In what legislative documents their results can be reflected? Moreover, these documents have to become mandatory for the authority, by any participants in the investment process. Probably, the only solution to this problem is serious research work on the study of the environmental quality of Yeniseysk, formalization of the basic requirements for the planning structure of the historic city and architecture of new objects, and normative codification of these requirements in the project of zones of protection and urban development regulations of zones of protection of objects of cultural heritage.

Returning simultaneously to the problem of preserving all time layers of the town, its ancestral morphological structure and architectural ensembles and to the order of modern infrastructures with the aim of sustainable land use a map of the landscape and morphological units must become the research base of reconstructive procedures and simultaneous definition of territories and activities. It is a reflection of the historical values for the renovation of the town, as it reflects both potential sites for restraining or limiting construction activity regulations, and the areas where not only construction activities but also other types of economy can and must be developed. The map essentially can predetermine territorial investment value. In this connection it is interesting to investigate the morphological structure of historical Yeniseysk.

Historical development and fringe belts forming

For the reconstruction of particular interest is the suburban belt formed by the end of the 18th century "embracing" the place of occurrence and development of the city.

Yeniseysk, the first Russian town in central Siberia was founded in1619 by boyar's son Peter Albychev and strelets' sotnik Cherkas Rukin, both being the leaders of a military detachment. In the XVII – XVIII centuries the waterway connecting the Russian state with new eastern territories lay through Yeniseysk. Routes of numerous expeditions to the east and north were laid from this place. According to researcher G.F. Miller[1] in the beginning

[1]Gerhard Friedrich Miller, 1705-1783, Russian historiographer of German origin, active councilor of state. Leader of the Second Kamchatka Expedition, organizer of Moscow State Archive.

it was just a small quadrangle stockaded town- ostrog[2], established with the only purpose of collecting tribute from ostyaks living along the Yenisey river and from the tungus inhabitants who settled the place to the east of the Yenisey. V.I. Kochedamov, the historian of architecture pointed out that the town had three towers and three walls with the fourth wall adjoining the coast.

The development around the fortress stretched along the left bank of the Yenisey in its wide upper part strictly in the longitudinal direction among taiga swamps of the peaty plain, in the middle of which there were a lot of wet puddles and ponds. The coastal panorama was directed towards the north. Initially the town had two tower-gates to the Yenisey – to the main transport link and a major land and waterway road to Makovsky blockaded town connecting the Yenisey and Ob basins.

Inside the town there were buildings typical of Russian fortresses: a wooden church, money and sable barns, two granaries, gathering house (izba)[3], customs house, voevoda's, gostiny dvor (arcades), a prison.

From the first years of the town's existence inhabitants actively started to use small rivers for their household needs. Rivers embraced the most convenient platform for the construction of the city. One of them was called the Melnichnaya due to the construction of building mills and barns in its valley.

By the middle of the 40-ies of the XVII century the Yeniseisk development had gone beyond the fortress wall and posad[4] started to be formed; by 1650 the Yenisei town had been rebuilt and eight towers were erected, six of them being gate towers. In 1666-67 a new ostrog was built with gate and watchtowers behind the Melnichnaya river. At the same time the two-part structure of Yeniseisk (a fortress and posad) was supplemented by monasteries. In the opinion of Cyprian, the first Siberian archbishop, monasteries in Siberia were built not far from towns to convert foreigners into Orthodox faith. In 1642 Spasskiy male monastery was established, built at the tallest hill in the midst of the marshes, southwest side of the Yenisei ostrog. In 1664 in the mouth of the Melnichnaya river a female convent was formed. In 1765 Nikolai Sapfary, the Russian envoy on his way to China described a fortified convent behind the river. By the end of the XVII century the convent had become a guard outpost on the approaches to Yeniseisk from border lands in the upper course of the Yenisey. Spasskiy monastery had the same function to meet travelers along Makovskaya road from western Siberia. In 1677 Yeniseisk became a regional town. It was in charge of Yeniseisk, Mangazeya, Krasnoyarsk, Irkutsk, Nerchinsk, and Abazinsky uyezds (districts), that is it was responsible nearly for Eastern Siberia in whole.

One can represent the Yenisey structure judging by the drawing of "Lands of the Yenisei town" in an atlas book by Semen Remezov under the title "The Drawing Book of Siberia" written in 1701 but published only in 1882 in Russia.

[2]Ostrog – a fortified construction, permanent or temporary blockaded populated area with a fence from sharpened in the upper part logs (stakes), 4-6m long. Initially this was the name for the fence itself from sharpened stakes in the time of siege of hostile towns in Russia. Beginning from the XIII century the ostrog consisted of a log tyn (paling, a row of stakes) and the so-called taras, that is log ventsy (row of logs). The log fence of the ostrog was placed in flat terrain or at the top of a small earth bank and was surrounded by a ditch from the outside. As a rule the ostrog was rectangular-formed. There were towers in the corners. For communication with the field passers-by towers were used.

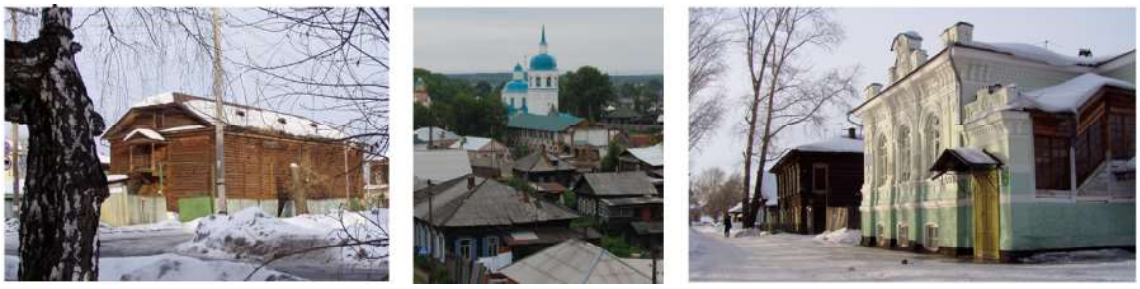
[3]All the matters related to town and uezd management were dealt with in a mandatory or gathering izba with a clerk from Moscow being responsible.

[4]Posad (podol) – initially a populated area outside the kremlin or ostrog; the part that was added to the town, where torzhyshe (trading area) and artisan slobodas were situated. In the time of war the posad used to be completely destroyed by the enemy or by fire. The posad population took shelter in the kremlin or was killed (if the kremlin was small, or in case of unexpected attack when they had to close the gates in a hurry).

The name posad was fixed in North-East Russia in the XII – XIII centuries.

Later posad areas were districts with commercial and industrial population not having the town status and in the middle ages – not having towers.

Figure 3. Typical buildings for the fringe belt: warehouse, church, fragment of merchants street



Картинка

In 1704 the town was almost completely burned in a devastating fire. In 1707 decision related to stone construction was taken. For this purpose a Moscow bricklayer called Fedot Merkuriev Chaika was sent from Tobolsk in 1708. Yenisey voevoda Boris Glebov gave instructions to teach young people from Cossacks and civilians stone business. As a result the first stone cathedral appeared in 1712.

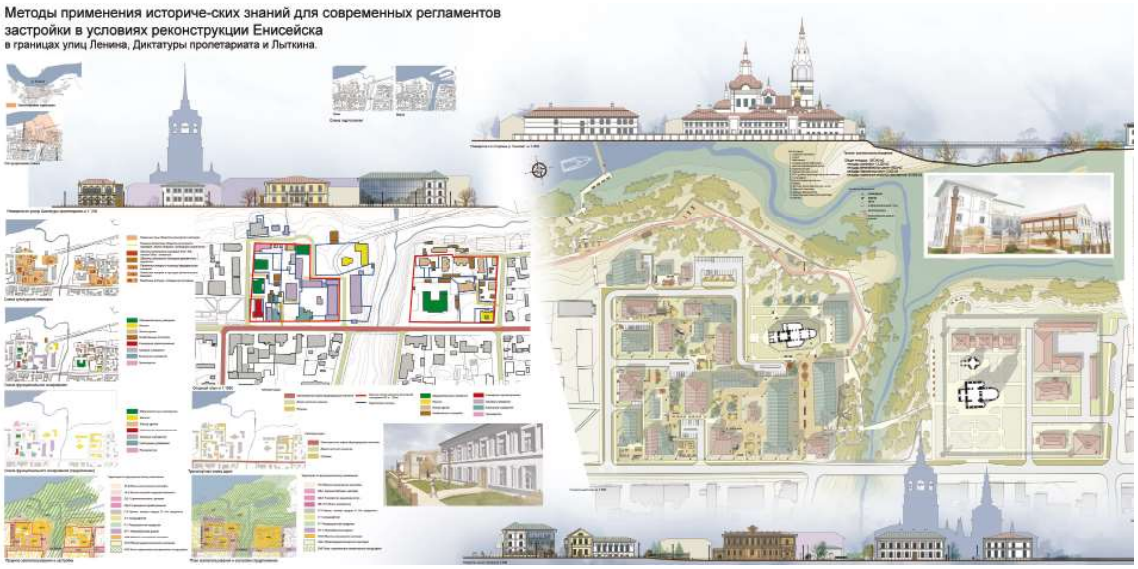
The most complete description of Yeniseisk of the 1730-ies was performed by the members of the Second Kamchatka Expedition. Graphic representation was carried out by artist Iohann Wilhelm Lursenius; G.F. Miller described the Yeniseisk condition of 1734-1735; the Yeniseisk plan of the period was also supposedly prepared on the visual base by the expedition members. According to G.F. Miller "…in the middle of the town one can still see what has been preserved from the first ostrog, surrounded by dwellings"; he also left description of the suburbs: 'through the town flows a small river into the Yenisey; the river originates from two boggy springs just behind.. a wooden wall…a little bit further there is one more river named the Lazarevka falling into the Yenisey. On its left bank there is a male monastery and a palace of Mangazeysky monastery…and on the right bank of the river there is a leather factory owned by the Yeniseisk Cossack head". While the monastery and the factory are clearly shown in an engraving, they are missing in the plan of Yeniseisk. They might have been behind the town wall. A comparative analysis of text descriptions and plan drawings has given grounds to establish the structure of the town by the middle of the XVIII century. Posad behind the Melnichnaya river where blacksmiths – gunners settled was growing more intensively; they had a specially allocated territory further from ostrog due to precautions against fire. Here there were about 200 households that amounted to the quarter of all inhabitants. The posad contacted the town by means of a bridge. Being very small in the periods of floods the artisan posad was cut off entirely from Yeniseisk for a long time. That is why an own spiritual public center attached to the female convent was formed.

Along the road from the posad and farther about 300 m away from the bank in the coastal zone the main town objects were concentrated. Their placement was guided by the perception not from the land road –"inside", but from the Yenisey broad water surface – "outside'. The main town dominants – town and monastery churches were placed in a row along the bank in the foreground and in the rising ground. This principle had been preserved for more than two hundred years in spite of rapid pace of stone construction which began in the second half of the 1730-ies.

This period was connected with the development of commerce, artisan production, metal, salt production, shipbuilding, etc. Yeniseisk became the largest center of stone construction in Siberia. Monasteries were completely renovated. Finally by the decree of Catherine II the period of Russian towns reconstruction began; For this purpose regular plans started to be developed. Several plans were made for Yeniseisk. But in spite of centralized construction they had to maintain the town two-part structure as well as an outline of its main separated parts (monasteries and housing mixed with the craft production areas around them) depending on the geographical town base.

In the first project plan a surveyor – designer was trying to give (varying dimensions of rectangular quarters) new directions for cross streets, retaining two main ones. It should

Figure 4. Step of renovation - "returting" of the historical panorama. Project of the female monastery area renovation



be noted that by the end of the XIX century the town had acquired the structure close to the first regular plan.

The subsequent description of the town has shown that in the upper part of the town there were dilapidated and non-regular buildings, crooked and narrow streets, and in the lower – planned structures. The third part, called Barabinskaya Sloboda (the former free territory before planning) adjoined the south; the fourth part to the east was separated by the Lazarevka river; further came Vinokurennaya Sloboda with 50 houses and a cedar garden. This information has demonstrated free non-regular town development in defiance of regular plans.

We can state the formation fringe belt in the classical understanding urban morphology: a small amount of housing; a sparse road network, the hence constituting a barrier zone to vehicles, well-vegetated plots, frequently containing institutional, sometime "landmark", buildings of architectural note; and the fact that they form a boundary between historically and morphologically distinct housing areas.

In 1782 Yeniseisk became a district town with a two-storeyed stone Gostiny Dvor (arcades) – the largest civil construction for daily commerce; the fair was held in August not only for Siberian merchants to come but for Russia in whole. For a quarter of the century the central part of the town had radically changed, since it was the most dilapidated area. The center was completely rebuilt according to the plan of 1773.On the bank there appeared a large administrative and trading square. Construction of Gostiny Dvor and other town objects for commercial activity allowed to rank Yenisei among the best trade towns of Siberia at the end of the XVIII century. The territory of market and market square were "concreted" at that period.

"Inner landscapes" – second understanding of the Yeniseysk fringe belt of the XVIII century

Yeniseysk fringe belt of the XVIII century mostly green area.

In a number of publications investigating the morphology of urban systems there has appeared the notion of 'inner landscapes", being understandable at first site: some objectively existing natural substance is being characterized by the inner unity of its forms of manifestation and self-development – dynamics and orientation from the point of primarily green systems (or "ecologically sensitive") development. In parallel, invariably, enjoying wide popularity, and being the burning issues there exists an ideal wish of town

planners to create single continuous green systems. At that "inner landscapes" are included by researchers into the artificial hierarchies of a higher level.

One can say that here arises a number of dissonances. The contrast of artificial and natural beginnings has started to turn the notion head over heels because of irreversibility, permanence of natural laws of landscape development and vice-versa, variability of artificial environment formation regulations, created by person's mentality in accordance with the level of engineering and technology development. At the same time the urban process is looked upon as a force capable to break the immutability of a natural complex. At that each period of technical progress is accompanied by its own legislative and normative-regulation base in architectural and town building creation. Natural laws remain unchanged, their depth and time period of back reaction to anthropogenic processes are being changed subject to their scale. "Inner landscapes" are treated in rehabilitation strategies, renovation of town building objects and a multitude of other actions with the prefix "re", since they are looked upon as a different world, parallel reality, specific territories where nature gives its place of cause and effect to the will and success of organized social life. Nonetheless, the ethics of understanding of the value of the survival of all life on the planet is gaining force.

Few design thoughts based on resource of Fringe belts understanding for the historical renovation

- town structure preservation
- regulation of economic activity
- regulation of the built and natural environment
- a green belt with the touristic service system inclusion around the historical core
- architectural heritage reconstruction as the integral part of the historical environment
- a shape of old streets reconstruction based on the analyses of the forms and materials characteristic to the period of XVII-XVIII-beginning of XIX century

Conclusion

Fringe belts could be considered as an integrating dialectic "sponge" between new and old functions, architecture and new and old forms of urban life "inscribed" into historical and contemporary world. It could be considered as inner buffer zone where a number of households – so-called "typical urban Siberian homestead", green belt are preserved, historical form should be preserved and new businesses could be developed.

References

Baker, N.J. and Slater, T.R. (1992) `Morphological regions in English medieval towns', in Whitehand, J.W.R. and Larkham, P.J. (eds) *Urban landscapes: international perspectives* Routledge, London

Conzen, M.R.G. (1960) *Alnwick, Northumberland: a study in town-plan analysis.* Institute of British Geographers Publication 27 (George Philip, London).

Conzen, M.R.G. (1968) `The use of town plan analysis in the study of urban history', in Dyos, H.J. (ed.) *The study of urban history* Leicester University Press, Leicester

Gutsalenko, V.I. (1984) 'Landscape-ecological approach to historical environment preservation and future development', *Review of the Centre of Scientific Information on Architecture and Civil Construction* (Moscow) 3, 1-46.

Hauke, O.M. (1961) 'City planning', *Proceedings of the Sixth Session of the Academy of Civil Construction and Architecture of the USSR on Planning and Urban Design Problems, 7-9 December, 1960, Moscow*, 348-62.

Kukina, I.V. (2006) 'Fringe territories of Siberian cities', *Architectural Heritage* (ComKniga, Moscow) 46, 289-97.

Lavrov, V.A. (1966) 'Cities are changing their structure', *Architecture of theUSSR*, 11, 12-14.

Neef, E. (1967) Die theoretischen Grundlagen der Landschaftslehre (Haack, Gotha).
Solntsev, H.A. (1960) 'On the interaction of 'live' and 'lifeless' nature', *Bulletin of Moscow State University* Geography Series 6, 15-19.
Tobilevich, B.P. (1981) 'The problems of the rural environment', *Architecture of the USSR* 6, 40-1.
Gorbachev V.T., Kradin N.P., Kradin N.N., Tsarev V.I., Stepanskaya T. M. (2011) Town Planning of Siberia, *NIITIAG RAASN,* St.Petersburg, 784 p.
Troll, C. (1971) 'Landscape ecology (geo-ecology) and bio-cenology: a terminological study', *Geoforum* 8, 43-6.
Whitehand, J.W.R. (1988) 'Urban fringe belts: development of an idea', *Planning Perspectives* 3, 47-58.
Whitehand, J.W.R., Morton N.J. (2004) 'Urban morphology and planning: the case of fringe belts', *Cities*, Vol.21, No 4, p. 275-289

Chair_Kai Gu
School of Architecture and Planning The University of Auckland, New Zealand
University of Birmingham, United Kingdom
Co-Chair_Elisabetta Barizza
Draco PhD School, "Sapienza" University of Rome, via A. Gramsci, 53, 00197, Rome, Italy

New Researchers Forum

Comparing different morphological approaches: historico-geographical, process typological, space syntax and spatial analytical

Vítor Oliveira, Cláudia Monteiro, Jenni Partanen
Centro de Investigação do Território, Transportes e Ambiente, Faculdade de Engenharia, Universidade do Porto, Rua Roberto Frias 4200-465 Porto, Portugal
CM Arquiteta, Rua do Lindo Vale 435, 4200-372 Porto, Portugal
Tampere University of Technology, School of Architecture, Urban Planning and Design, POB 600, 33101 Tampere, Finland
Keywords: urban form, Conzenian school, Muratorian school, space syntax, spatial analysis

Abstract

The diversity and complexity of cities is somehow mirrored by the diversity of morphological approaches to describe and explain them. Against this background, many authors have argued on the need to develop comparative studies in urban morphology. This paper is based on a recently concluded project, 'A comparative study of urban form', funded by the International Seminar on Urban Form. It compares four different approaches to urban morphology: historico-geographical mainly promoted by the Conzenian School, process typological largely developed by the Muratorian School, space syntax, and spatial analytical (cellular automata). It explores in particular the use of four fundamental concepts proposed in these approaches: morphological region, typological process, spatial configuration, and cell. The four concepts are applied in a traditional gateway area of the city of Porto, Portugal, the Rua Costa Cabral. The area includes considerable variety of urban form, including continuous building frontages, broken frontages of single-family housing, and areas of isolated buildings. The main purpose of the paper is to understand how to combine these four approaches so as to improve the description, explanation and prescription of urban form. The possibility of constructing a co-ordinating framework is explored.

Introduction

A full version of this paper was first published in the journal 'Urban Morphology' (Oliveira et al., 2015).

The diversity and complexity of the physical form of cities is reflected in the variety of morphological approaches to describe, explain and prescribe it. Researchers and practitioners dealing with specific urban form problems are often faced with the need to select between different approaches without much knowledge of their main strengths and weaknesses.

Research projects are frequently designed with insufficient thought being given to how their findings may be related to those of other studies. Problems of comparison are made more difficult by the fact that research is undertaken within several disciplines and published in different languages (Whitehand, 2012).

In addressing the need to develop comparative studies of urban form, some projects have focused on the utilization of one morphological approach, or one concept or method, in different types of urban area in different parts of the world. Whitehand (2009) describes the utilization of the method of morphological regionalization for identifying and mapping urban landscape units in different geographical contexts. Conzen (2009) offers a comparative assessment of the performance of the fringe-belt concept in the different cultural settings in which it has been applied. He also examines the results of the European Historic Towns Atlas, a programme concerned with the preparation of maps of individual towns at a common scale and similarly designed in order to develop comparative analysis (Conzen, 2008).

Other authors have explored the utilization of different approaches in a single study. Osmond (2007) proposes an integrated classification framework of urban form, bringing together complementary morphological techniques and applying them in Sydney, Australia. Pinho and Oliveira (2009) study the evolution of the urban form of Porto, Portugal over the last two centuries, combining Conzenian and space syntax approaches. Similarly, Griffiths *et al*. (2010) combine these two approaches, within an integrated GIS environment, to analyse the persistence of suburban centres in Greater London, UK.

Whitehand (2001) and Maffei and Whitehand (2001) explore the relation between the Conzenian morphological period and the Caniggian typological process. The latter concept sheds light on the former by conceptualizing how the forms that are characteristic of one morphological period are superseded by those characteristic of the next.

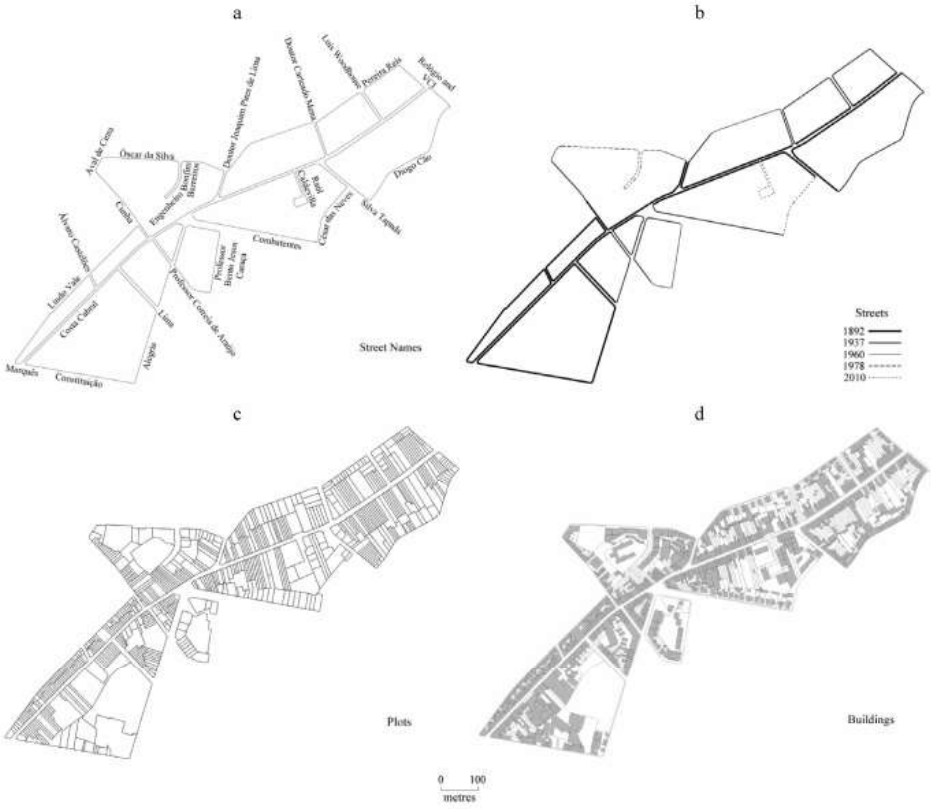
Kropf (2009) undertakes a critical analysis of publications representative of the spatial analytical, configurational, process typological and historico-geographical approaches. His ultimate goal is to establish a composite framework in which the different approaches support each other to provide a better understanding of human settlements.

The main purpose of this paper is to understand how to combine and co-ordinate different morphological approaches to improve our ability, as researchers and practitioners, to describe, explain and prescribe the physical forms of cities. This research compares fundamental concepts proposed in each of the four different approaches to urban morphology: the morphological region (historico-geographical approach), the typological process (process typological approach), spatial configuration (space syntax) and the cell (cellular automata or, more generally, spatial analytical). The possibility of constructing a co-ordinating framework is explored.

Due to length limitations the paper will focus on the application of the first and second approaches. A brief introduction to the third and fourth approaches is offered in the following paragraphs and their application in Porto is described by Oliveira *et al.* (2015).

Space syntax research began at the end of the 1970s, with the main purpose of understanding the influence of architectural design on social problems in many housing estates that were being built in the United Kingdom. Hillier and Hanson (1984) defend a theory that a descriptive autonomy for space can be established, enabling the consideration of a wider morphological variety to reflect the different relationships between space and society. A new view of architecture and the city is proposed, emphasizing those urban spaces that people move through and where social and economic activi-

Figure 1. Rua de Costa Cabral: (a) and (b) streets, (c) plots and (d) buildings. Figure 1b displays the year of construction of each street according to the main city plans. (Source: Oliveira et al., 2015)



ties are carried out. A key outcome of space syntax is the concept of spatial configuration, in which relations take account of other relations in a complex (Hillier, 1996).

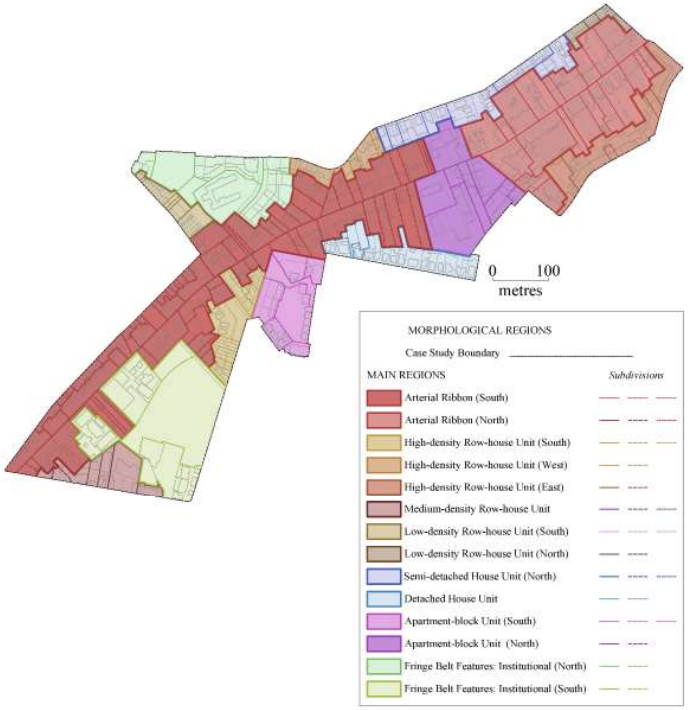
Cellular automata (CA) are simple, discrete representations of spatial systems. They operate within a grid based on elementary rules defining the state of the cell (*on* or *off*) according to the state of the neighbours (the adjacent cells) and their relation to the cell itself. CA operates over time. Starting from an initial state (defining which cells are *on* or *off*), each generation is updated based on the previous cell states according to given rules (such as the number of neighbours required for turning the cell *on*). This produces often unpredictable patterns and dynamics, implying that the system is capable of reproduction, and also of simulating self-organizing, emergent structures.

Rua de Costa Cabral, Porto

The four morphological concepts (morphological region, typological process, spatial configuration and the cell) are applied in Rua de Costa Cabral and its immediate vicinity in Porto, Portugal. This road consists of two different parts separated by a ring road. Attention is focused on the southern and oldest part of the street and on the twelve street blocks fronting it (Figure 1). This part of Rua de Costa Cabral is 1400 m long and has an average width of 11 m. The study area includes parts of other streets. The twelve street blocks have an average area of 24 800 m² (the largest block comprises 61 400 m² and the smallest block 3 800 m²), including 671 plots and 730 buildings.

Rua de Costa Cabral was built in the middle of the nineteenth century as an alternative to an older and narrower street, Rua do Lindo Vale, which is part of the western boundary of the study area. The area contains considerable morphological variety, including continuous building frontages, broken frontages of single-family housing, and areas of isolated buildings.

Figure 2. The morphological regions of Rua de Costa Cabral. (Source: Oliveira et al., 2015)



1528 **Morphological region (historico-geographical approach)**

The concept of the morphological region as an area of morphological distinctiveness, in terms of ground plan, building fabric and land utilization, and the method of morphological regionalization as a tool to recognize and delimit such an area was developed by M. R. G. Conzen, notably between the late 1950s and the late 1980s (Conzen, 1960, 1975). Over recent decades the concept has been applied in research in different parts of the world and, in rare cases, in planning practice. Although Conzen has provided a widely applicable method, it would be unrealistic to expect this to be developed to the point of allowing patterns of urban landscape units to be precisely replicated by different researchers or practitioners (Whitehand, 2009).

The starting point for the identification of morphological regions is the historico-geographical structure of the landscape. It is a dynamic, rather than a static, approach to the urban landscape. In the case of Porto, the earliest plan was that of 1892 by Telles Ferreira. Subsequently nine other plans have been prepared of the city (1903, 1932, 1937, 1948, 1960, 1978, 1992, 1997 and 2010). The analysis draws on this set of plans, on archival documentation and on field survey, to understand the development process of these streets, plots and buildings, both within and around the study area.

The identification of boundaries within the study area is in some respects made more difficult by the elongated shape of the area, which was influenced by the need to delimit an area of practicable dimensions. One consequence of this is that some regions are in fact parts of regions that extend beyond the study area. The elongated shape does, of course, also affect the other three approaches employed (process typological, space syntax and spatial analytical).

A four-tier hierarchy of regions was identified. The identification of the main regions (order 1) is based on the ground plan (Table 1). It takes into account the form and age of the street, the type of plots, the building block-plans, and the position that buildings occupy in their plots. The ground plan also contributes to the identification of regions of intermediate rank. The criteria for the identification of the second- and third-order regions are the

ground plan, the building fabric and, to a lesser extent, the land utilization. The appraisal of the building fabric includes the age of buildings and their volume (particularly their height).

Table 1. The contribution of different morphological attributes to urban landscape characterization

Attribute	Persistence	Contribution to hierarchy (rank)
Ground Plan	High	Mainly high and intermediate
Building Fabric	Variable, but often considerable	Mainly intermediate and low
Land Utilization	Low	Mainly low and intermediate

Source: Adapted from Whitehand (2007).

Fourteen first-order morphological regions were identified (Figures 2 and 3): (i) two stretches of Arterial Ribbon (north and south); (ii) three High-density Row-house Units, one Medium-density Row-house Unit and two Low-density Row-house Units; (iii) one Semi-detached House Unit; (iv) one Detached House Unit; (v) two Apartment-block Units; and, finally, (vi) two Fringe-Belt features (institutional). While all these morphological regions contain second- and third-order subdivisions, half of them also contain fourth-order subdivisions. In Figure 2, the colour of each unit reflects the landscape within that unit. The two fringe-belt sites, with fairly low building coverage and fairly large vegetated areas, are in shades of green. The Southern Arterial Ribbon, which is the unit with the most hard surface and highest building coverage, is in deep red.

Typological process (process typological approach)

The typological process is a succession of types in the same cultural area – diachronic changes – or in several cultural areas in the same space of time – synchronic changes (Caniggia and Maffei, 1979). For Caniggia and Maffei, the type is a cultural entity rooted in, and specific to, the local process of cultural development.

The starting point for the identification of the main residential building types in the study area was an analysis of existing residential buildings, mainly based on field survey and cartographic analysis. A set of examples of each type was then studied, including the internal organization of rooms and spaces. An important constraint in Porto was the fact that building applications prepared before the twentieth century did not include a building plan. However, the main changes of building types that occurred in the twentieth century were identified (Figure 4).

The main differences between the buildings in the study area are: (i) the position that each building occupies within its plot and its relation to adjacent buildings; and (ii) the size and shape of the plot. Particularly in the case of terraced- and row-houses, the width of the plot is fundamental. Figure 4 distinguishes between narrow plot frontages in which the plot width is less than 5 m and the façade of the building includes two 'bays' (two doors or one door and one window in the ground floor; two windows in the upper floors); medium plot frontage; and wide plot frontage (more than 10 m).

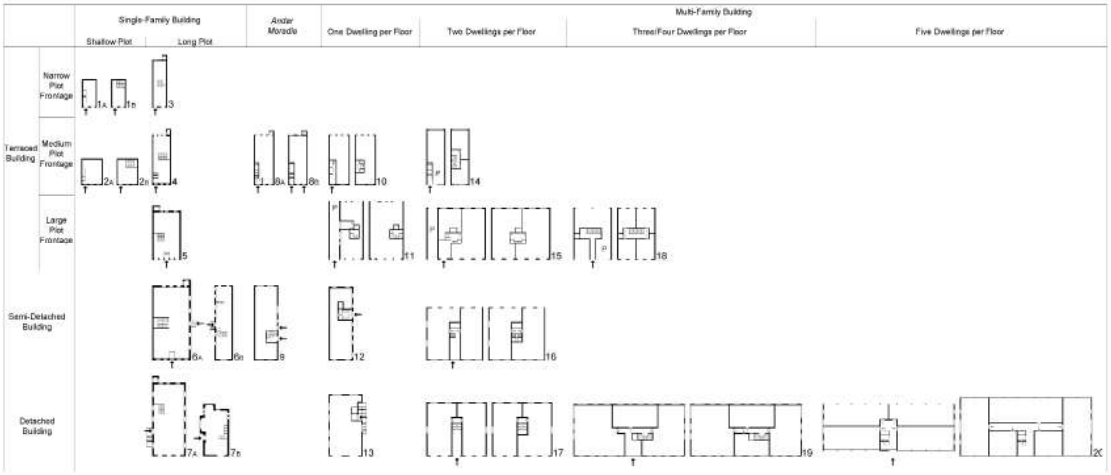
The two oldest street blocks in the study area, facing Rua do Lindo Vale, include one shallow narrow-frontage plot (type 1 in Figure 4) and a number of shallow medium-width plots with buildings of one façade only, including three bays (type 2). The staircases of these buildings, some of which have only one room per floor, are located near the door, perpendicular to the street, or at the rear of the building, parallel to the street. Sometimes, in the oldest areas of Porto, the street blocks have limited depth and plots have frontages facing two different streets. According to Barata (1996) this has led to a fundamental change in the internal organization of houses: the sequence *room+stair* is replaced by the sequence *room+stair+room*, with the stair being located in the middle of the plot parallel to the street (type 3). The new sequence, sometimes with a private backyard, implied

Figure 3. Morphological regions in Rua de Costa Cabral: (a) Arterial Ribbon (North); (b) High-density Row-house Unit (East); (c) Semi-detached House Unit; (d) Detached House Unit; (e) Apartment-block Unit (North); (f) Fringe-Belt Features: Institutional. (Source: Oliveira et al., 2015)

the existence of longer plots, but not wider. For example the transformation of type 1b (*room+stair*) into type 3 (*room+stair+room*) took place in plots of similar width.

The first column of Figure 4 refers to single-family houses. The majority of these were built in the early decades of the twentieth century. Single-family terraced, semi-detached and detached buildings share certain characteristics. The sequence *room(s)+stair+room(s)* is dominant: extra rooms, *alcovas* (with no daylight), are sometimes included. Type 4 is an evolution from type 2 (in a longer plot) and of type 3 (in a wider plot). While the ground floor

Figure 4. The typological process in Rua de Costa Cabral. (Source: Oliveira et al., 2015)



of some buildings is at street level, in other cases (type 4, type 5) the house floor is about 1 - 1.5 m above street level and there is a basement area. Type 5 is an evolution from type 4, including five bays and a new central location of the door, which allows a new organization of rooms and spaces based on a central corridor. Type 6a is an evolution from type 5, maintaining the door in the centre of the façade and introducing a second door at the side. Type 6b has a single door, at the side. In some of these single-family buildings there is commercial use on the ground floor. In these cases a staircase leads to the first floor where the sequence *room(s)+stair+room(s)* is common. Types 7a and 7b are the detached houses. They share some characteristics but they have different architectural languages, and 7b is smaller than 7a; usually the façade of the former is set back from the plot boundary.

The transition from single- to multi-family buildings is evident in the *andar-moradia*, a two storey building with two dwellings – one dwelling per floor. Types 8a and 8b draw on type 4. In the first case, the street façade has only one door (as in type 4) and the access to each dwelling is through a common space inside the building. In the second case, the street façade has two doors, one for each dwelling. The staircase of the upper dwelling is perpendicular to the street. Despite its nature, as part of the transformation process from single-family building to multi-family building, the construction of the *andar-moradia* continued over the twentieth century, as in the case of type 9 (drawing on two types, 6 and 8).

From the 1940s onwards a large number of multi-family buildings started to be built in the study area and in other parts of the city. The first buildings were erected in the plots of demolished single-family houses. This occurred in plots with both wide and medium-width frontages (types 11 and 10). In a first phase of development the new buildings contained one dwelling per floor, sharing some characteristics of the *andar-moradia* (types 8 and 9). In a second stage they contained two dwellings per floor – front and rear (sometimes with commerce on the ground-floor) in the case of medium-width plots (type 14); left and right, in the case of wide plot frontages (type 15). In plots with wide frontages, there were three or four dwellings per floor (type 18). Influenced by the commercial nature of the study area, many of the new buildings included a commercial use on the ground floor. In the later buildings of this type the staircase was not on the peripheral wall but at the centre of the building.

Semi-detached multi-family buildings did not undergo a significant change over time. However, particularly after the 1970s, a new system of vertical access – a gallery – was introduced allowing a larger number of dwellings per floor (type 20). A comparison between the width of the building frontages of type 20 and type 1 shows that the former is almost ten times wider than the latter.

Over the second half of the twentieth century and in the early years of the twenty-first century there was a decrease in commercial use of the ground floor and increased construction of parking spaces underground and on the ground floor.

Discussion

The main points of contact between the four concepts are threefold (Table 2): elements of urban form (the most important class), levels of resolution, and time.

The concept of the morphological region shares with the cell the emphasis on the ground plan, particularly on plots and land utilization. Indeed, plots and land utilization are two fundamental elements for the identification of morphological regions at all ranks, and are the basis for the development of the cellular matrices. In contrast, the two concepts have different conceptions of time: in the former, history has a fundamental role in the description and explanation of the urban landscape; in the latter, the main concern is with anticipating future scenarios of urban development. In respect of the local scale of analysis undertaken in this paper, the concept of the morphological region would seem to be more appropriate

The emphasis on ground plan is shared by the concepts of the morphological region and spatial configuration. Streets are an essential element for the identification of regions of high and intermediate rank, and streets alone are the basis for the recognition of high accessibility. As in the case of the morphological region and the cell, these two concepts seem to have different levels of resolution and different conceptions of time.

Of the four concepts, those of the morphological region and the typological process seem to have the strongest inter-relation. Buildings are the most consistent link. The typological process draws on the building fabric as a whole to reveal the fundamental building types, the main relations between them and how they evolve over time. The block-plans of buildings (two-dimensional) and the building fabric (three-dimensional) are crucial for the identification of morphological regions at all scales. The two concepts share a similar level of resolution, from the small- to the medium-scale of analysis. In the process typological approach, a number of concepts and methods have been developed to deal with certain morphological aspects at a large-scale of analysis. The two concepts share a particular conception of time in which history offers a sense of continuity in the production of urban forms.

Table 2. The main points of contact between the different concepts

	Cell	*Spatial Configuration*	*Typological Process*
Morphological Region	**Form**: ground plan (plots) and land utilization	**Form**: ground plan (streets)	**Form**: ground plan (buildings) and building fabric **Resolution**: small- to large-scale analysis **Time**: importance of history
Typological Process			
Spatial Configuration	**Resolution**: medium- to large-scale analysis **Time**: anticipation of future scenarios		

Source: Oliveira *et al.* (2015)

The most fragile relations in this set can be found between the typological process and the cell, and between the typological process and spatial configuration. While it could be that buildings might offer a link between these concepts, the way they are dealt with in the three approaches is considerably different and would seem to preclude the establishment of any effective relation.

Though not explored in this study, the concepts of spatial configuration and the cell share a similar level of resolution, from the medium- to the large-scale of analysis. They

also share the same conception of time, anticipating and testing different alternatives for the development of urban areas. But, the two concepts have no common ground in respect of elements of urban form.

A co-ordinating framework

The analysis of existing relations suggests that the concept of the morphological region may have the necessary characteristics to provide a framework to combine and co-ordinate the different concepts. For Conzen the morphological region was not 'only' a concept – meaning 'an area with a unity in respect of its form that distinguishes it from surrounding areas' – but also the integration of the physical development of an urban area. It united the tripartite division of the urban landscape (town plan, building fabric, and land and building utilization), and it brought together the main concepts that he developed about the process of urban development.

The main purpose of this framework is to analyse, in the most effective way, the physical form of a given urban area. Owing to the nature of each concept and the results that it offers, a sequential application of the four concepts is defended: (i) morphological region, (ii) spatial configuration, (iii) typological process, and (iv) cell.

The application of the concept of the morphological region provides a number of results related to the historico-geographical structure of the landscape. The results for each street are mainly concerned with its morphogenesis and the plots and buildings expressing it. However, the application of spatial configuration reveals something that the morphological region does not: the 'accessibility' of each street within the urban system. It might be expected that a higher density of streets, plots and buildings would correspond to a higher accessibility of streets. Although the case study confirms this general relationship, it also reveals exceptions – for instance, the Detached House Unit, has a low density but is located in Avenida dos Combatentes (Figure 2d) which has high accessibility.

Clearly the results provided by the application of the two concepts are different in nature. If the purpose of the application is not only description and explanation but also prescription, the two concepts both offer important outputs. The morphological region facilitates the definition of rules for the future transformation of the main elements of urban form. Spatial configuration allows the testing of different alternatives for transformation of the street system. The two concepts can be combined in formulating proposals for the development of that street system.

Application of the typological process offers a set of results on building types and their evolution over time. Though this type of output is clearly distinguishable from that provided by the spatial configuration concept, it has a strong relationship to the results obtained by applying the morphological region concept. The Avenida dos Combatentes corresponds to a Detached House Unit, including nineteen plots and nineteen buildings. A typological reading of this area revealed the existence of four different types (6b, 7b, 13 and 17) that explain, to a large extent, the different intermediate rank regions. But it also revealed the typological evolutions leading to the definition of these types. This kind of information can, as in the case of spatial configuration, inform the fine-tuning of a boundary of an intermediate-rank region. If the purpose is prescription, the application of the typological process can, in combination with morphological region delimitations, inform rules for the future transformation of buildings.

Finally, the application of the concept of the cell offers valuable information on the dynamics of land and building utilization. Its insights can contribute to rules for the future transformation of urban functions.

Conclusion

Developing comparative studies of different approaches in urban morphology is a challenging task. The application of four approaches to a study area in Porto suggests the concept of the morphological region as a co-ordinating framework. The main points of contact between the different approaches have been identified and a general meth-

odological procedure has been outlined, but further work is needed to develop this line of investigation. A number of questions arise. First, would some other morphological concept be relevant for the purposes of comparison and co-ordination? Secondly, would it be pertinent to explore a different focus within some of the concepts (exploring, for example, a focus on buildings, within the concepts of spatial configuration and the cell)? Thirdly, how can this methodological process be developed, enabling a stronger interaction between concepts and developing the interactive capacity of the morphological region? Fourthly, what are the most effective ways to present the results of such an integrated analysis and design? Future research should help to provide answers to these questions and continue to inform the construction of an integrated framework to better describe, explain and prescribe the physical form of cities.

References

Barata, F. (1996) *Transformação e permanência na habitação Portuense. As formas da cidade na forma da casa* (FAUP Publicações, Porto).

Caniggia, G. and Maffei, G. L. (1979) *Composizione architettonica e tipologia edilizia: 1. Lettura dell' edilizia di base* (Marsilio, Venice).

Conzen, M. P. (2008) 'Retrieving the pre-industrial built environment of Europe: the Historic Town Atlas programme and comparative morphological study', *Urban Morphology* 12, 143-56.

Conzen, M. P. (2009) 'How cities internalize their former urban fringes: a cross-cultural comparison', *Urban Morphology* 13, 29-54.

Conzen, M. R. G. (1960) *Alnwick, Northumberland: a study in town-plan analysis* Institute of British Geographers Publication 27 (George Philip, London).

Conzen, M. R. G. (1975) 'Geography and townscape conservation', in Uhlig, H. and Lienau, C. (eds) *Anglo-German Symposium in Applied Geography, Giessen-Würzburg-München* (Lenz, Giessen) 95-102.

Griffiths, S., Jones, C. E., Vaughan, L. and Haklay, M. (2010) 'The persistence of suburban centres in Hillier, B. (1996) *Space is the machine* (Cambridge University Press, Cambridge).

Hillier, B. and Hanson, J. (1984) *The social logic of space* (Cambridge University Press, Cambridge).

Maffei, G. L. and Whitehand, J. W. R. (2001) 'Diffusing Caniggian ideas', Urban Morphology 5, 47-8.

Oliveira, V. (2006) 'The morphological dimension of municipal plans', *Urban Morphology* 10, 101-13.

Oliveira, V., Silva, M. and Samuels, I. (2014) 'Urban morphological research and planning practice: a Portuguese assessment', *Urban Morphology* 18, 23-39.

Oliveira, V., Monteiro, C. e Partanen, J. (2015) A comparative study of urban form, *Urban Morphology* 19, 73-92.

Osmond, P. (2007) 'Quantifying the qualitative: an evaluation of urban ambience', in Kubat, A. S., Ertekin, Ö, Güney, Y. I. and Eyüboğlu, E. (eds) *Proceedings of the 6th International Space Syntax Symposium* (Istanbul Technical Üniversity, Faculty of Architecture, Istanbul) 134, 1-7.

Pinho, P. and Oliveira, V. (2009) 'Different approaches in the study of urban form', *Journal of Urbanism* 2, 103-25.

Whitehand, J. W. R. (2001) 'British urban morphology: the Conzenian tradition', *Urban Morphology* 5, 103-9.

Whitehand, J. W. R. (2007) 'Origins, development and exemplification of Conzenian thinking', unpublished paper presented to the Fourteenth International Seminar on Urban Form, Ouro Preto, Brazil, September.

Whitehand, J. W. R. (2009) 'The structure of urban landscapes: strengthening research and practice', *Urban Morphology* 13, 5-27.

Whitehand, J. W. R. (2012) 'Issues in urban morphology', *Urban Morphology* 16, 55-65.

Utility of urban morphology studies for the design process: some educational experiences

Alessandro Camiz
Faculty of Architecture, Design & Fine Arts, Girne American University, TRNC
Keywords: Cyprus, Latium, urban tissues, urban design, urban morphology

Abstract

Enhancing, within the educational teaching of architectural design, the strong continuity between the typological evolution of the built organism and the building to be designed (Petruccioli, 1998) can greatly improve the architectural design process. From the territorial scale, to the scale of the urban tissues, the understanding of the coherence of paths and settlement patterns within a given site morphology, is the prerequisite for the proper design of the built organism. The paper will illustrate some case studies, in Latium, Rome and Cyprus, focused on the knotting process (Strappa, 2013) and the Muratorian design method (Maretto, 2013), underlining the strong continuity (Whitehand, 2012) between the Conzenian approach and the Italian School of Urban Morphology (Marzot, 2002). From the form of the site and the diachronic evolution of settlement patterns, it is possible to infer the transformation to propose with the contemporary design. The territorial scale is therefore the specific methodological base for the full understanding of the scalar properties, verifiable within other scales, such as the urban organism scale, the urban tissue scale, and the built organism scale. (Cataldi, Maffei, Vaccaro, 2002).

«Towns have a life history.
Their development, together with the cultural history
of the region in which they lie, is written deeply into
the outline and fabric of their built-up areas»
(Conzen, 1960, p. 6)

Introduction

Greek mythology (Esiod, *Theogony*, 52) represented Mnemosyne, the goddess of memory, as mother of the nine muses; the archaic myth reorganized the genealogy between the arts (muses) and history (memory), showing history as the mother of the arts. It is not until the XX century that science could define scientifically the memory, at least the digital memory, with the introduction of the binary bit as a measuring unit. After the invention of informatics though, memory has gradually lost its role in society, following its substitution with digital memory. This process is following the *reification* of human memory, the translation of the German word *Verdinglichung* (Marx, 1894, p. 48). A famous historian, (Le Goff, 1988) outlined the history of memory through different societies, showing its role in the construction of political power. The memory does not survive orally, unless someone ritualises it through some form of art, such as music, dance, and we should say here also architecture. Therefore, only the organization of a society that transcends the familiar genealogy can keep the memories of the past and transmit them to the future generations. This operation is the base of the construction of the social aggregation of human beings and of political power. Giordano Bruno wrote an entire treatise on memory (Bruno, 1582) based essentially on the analogy of architectural spaces and information to be remembered, so we should recall today how important memory is within architectural education.

Enhancing, within the educational teaching of architectural design, the strong continuity between the typological evolution of the built organism (the memory), and the building to be designed (Petruccioli, 1998) can greatly improve the architectural design process. From the territorial scale, to the scale of the urban tissues, the understanding of the coherence of paths and settlement patterns within a given site morphology, is the prerequisite for the proper design of the built organism. The paper will illustrate some case studies, in Latium, Rome and Cyprus, focused on the knotting process (Strappa, 2013) and the Muratorian design method (Maretto, 2013), underlining the strong continuity (Whitehand, 2012) between the Conzenian approach and the Italian School of Urban Morphology (Marzot, 2002). From the form of the site and the diachronic evolution of settlement patterns, it is possible to infer the transformation to propose for the contemporary design. The territorial scale is therefore the specific methodological base for the full understanding of the scalar properties, verifiable within other scales, such as the urban organism scale, the urban tissue scale, and the built organism scale. (Cataldi, Maffei, Vaccaro, 2002).

Some of the graduating thesis developed within the PRIN 2009 illustrate herein the application of the above premises. The National Research (PRIN) was named "From urbanized countryside to "expanding city": the norms of composition for the architecture of the territory of minor centres", and directed by L. Ramazzotti, Università degli Studi di Roma "Tor Vergata", Facoltà di Ingegneria, Dipartimento di Ingegneria. The research Unit B, under the tile of "Intervention methods for development and design in urban tissues of small towns of Lazio", operated under the direction of G. Strappa, "Sapienza" Università di Roma, Laboratorio lettura e progetto dell'architettura (LPA-DIAP). All the projects follow the assumption that the city is a living organism belonging to a larger scale territorial organism, the historical documentation and the safeguard are necessary for the correct future development, it is necessary to understanding the origins for the contemporary design . All the cases shown belong to the category of small towns, considered as the nodal development of the intersection of a ridge and and cross ridge route, polarized by a market. These settlements developed through time in a hill top position to defend themselves from enemies, and to connect with allies. We considered the foundation

characters of *defence* and *connection* as the guidelines for the contemporary design. The defence from urban sprawl, and the connection with infrastructures.

Methodology

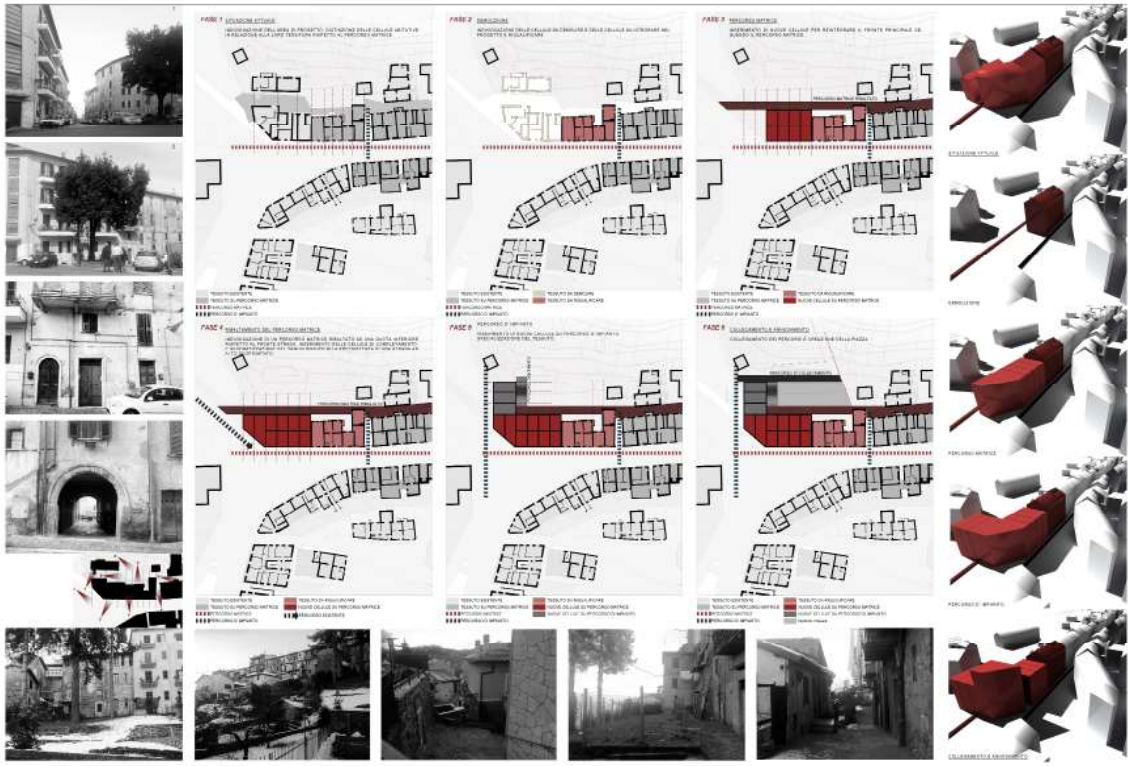
In accordance with a consolidated methodology (Caniggia, Maffei, 1979), (Strappa, Ieva, Dimatteo, 2003), by analysing small historical towns and their landscape it is possible to acknowledge the urban fabric's formation phases before considering their transformation project. The province of Rome's so-called "small" historical towns are an important cultural resource and, together with their tangible and intangible cultural heritage, form a unique social capital. We should optimise, protect, and above all documented these settlement, before an uncontrolled urban development will erase their historical memory forever. The case of San Vito Romano, analysed in accordance with the "close correlation between ancient documents and the settlements' physical conformation" (Guidoni, 2006), is characterised by separate phases that can be interpreted with a certain clarity. The case studies presented herein focuses on the area between Tivoli, Subiaco and Palestrina: an area characterised by various ethnic ridges, the Aequan, the Hernic and the Latial ridges. We selected two small towns San Vito Romano and San Polo dei Cavalieri, considered as belonging to the two different sides of the same orographic ridge, the watershed between the hydrographic basins of the Rivers Aniene and Sacco, which marked the boundary between various cultural areas as from ancient times. The geological area is extremely fragile, set between the Apennine and the Prenestine mountains, two calcareous ranges that push on each other, compressing the interlying layers of sandstone, distorting them into waves. Therefore, the alternating grey and yellow layers of sandstone are extremely crumbly and subject to landslides along the frequent slippery slopes, which can easily fall one onto the other during heavy rainfall.

Formation process

The third case study, the Αχειροποίητος monastery in Cyprus, shows the superimposition of different constructions. The existing domed church, built with a central plan in late byzantine times over the ruins of an early Christian basilica with three naves, and subsequently was enlarged by the addition of three successive narthexes, and therefore transformed into a Latin longitudinal basilica. The name Αχειροποίητος, literally made without hands, was referred most probably in the origins of this church to an icon "made without hands", so probably one of the numerous images of Christ or of the Virgin that are referred in history. The name, through several wrong writings and therefore misunderstandings survives to this day, telling us in an immaterial way a part of the history of a building conceived, and therefore named, to host this sacred image. The monastery surrounds the church, with different phases and different additions, bearing a long and very complex ownership history. The formation process can be traced as beginning with the late antique basilica built in the V century in the suburbs of the ancient city of Lapithos, all the way down to the transformation of the site into military barracks in the 1970'. Recently the Department of Antiquities assigned the complex to the Girne American University, for urgent preservation interventions. Therefore the management of this site, hence the political situation of northern Cyprus, represents an interesting case study on the ownership issue. The reconstruction of the diachronic sequence of ownerships is therefore a prerequisite for the full understanding of the different past phases of the building and hence essential for its preservation and continuation into the future. The history of ownership follows very slow changes, and in some cases, can give us some information about the formation process of the architecture. The heritage management in Cyprus, for the complex political situation of the island, bears more difficulties than in other UE countries, but we should consider that every heritage site has someway a contested character.

The International Centre for Heritage Studies was been established at Girne American University in August 2012 to bring together scholars and practitioners, and support a comprehensive approach to the study of heritage. The affiliates are academics in the fields

Figure 1. The formation process of the project, V. Cosenza, *Reading and designing San Vito Romano's urban organism*, Master Graduation thesis, Faculty of Architecture, "Sapienza" University of Rome, rapp. G. Strappa, co-rapp. A. Camiz, 2013



related to heritage studies (such as architecture, restoration, history, and archaeology) working at local, national, and international levels. The research centre's mission is to host researches and studies on heritage, in Cyprus and abroad, with particular focus on Architectural Heritage, including history, survey, documentation, restoration and design. During the international workshop "Reading and designing the area of Lambousa, Karavas", held in Girne in 2014, we started different researches on the monastery. Specifically the activities accomplished include the laser scanner survey of the whole complex, the documentation of mosaics, *spolia* and wooden artefacts, the study of the different historical phases of the monastery, the design of a museum to host the *Lambousa* treasure, the design of a garden, and the design of an addition to the building. The international workshop was essential for the wider international cooperation framework and an essential prerequisite for the preservation and continuation into the future of the monument together with the UNDP and the Technical Committee for Cultural Heritage in Cyprus.

The reconstruction of the formation process of routes and settlements in the area of the monastery is one of the premises, following the Italian school of urban morphology, for the design of an addition to the monastery. On the northern coast of Cyprus, a main mountain ridge goes all the way from the East to the West; from this main ridge, secondary ridges descend towards the sea organizing the slope in a readable territorial organism. Only with the full multi-scalar understanding of the urban, territorial and built organism, it is possible to design an architecture conceived as the continuation of the ongoing process. We conceived the contemporary design not as opposed to history, but rather as a continuation of the past into the future.

Teaching architectural design focused on archaeology is essential in Cyprus where ruins bear a relevant symbolic value: for the students the ruins become the living testimonies of a forgotten past. Several educational experiences have shown that architecture students, in the face of a ruin, assume a reflective attitude that forces them to consider

the *context*, in this case the *archaeological context*, as an integral part of the architectural design process. Often architecture students cannot understand ancient architectures, and therefore they are pushed to question their real subject expertise. They are indeed concerned about the ruins, since they belong to architecture, although old and abandoned, but cannot really deal with them. In other words, the relationship with the archaeological context triggers students' particular attention and leads them to consider the place and the artefacts that were there in the past as a single organism. The mental process of understanding the relationships between different parts of an ancient building facilitates the transposition of these relationships to the contemporary design of a *living organism*. Most difficult for an educational project within an archaeological area, is to transmit the choice of a *quiet poetic*: a compositional process based on the dialectics between foreground and background. If the main subject of the composition are the ruins, the proposed new architecture should assume a background role, cautiously avoiding any desire to emerge as an independent form. This composition exercise becomes crucial in contemporary architecture, where the research seems dominated by *striking figures* rather than by the silent construction of architectures in continuity with a still *ongoing process* (Strappa 2014). Designing within an archaeological area, we should also consider also the absence of a given frame or limit. In the ordinary design process, the frame is determined by the property limits, and inside this frame, the architect usually displays his compositional figures. An archaeological project instead overlaps different frames, one given by the excavation perimeter, the other by the limits of existing public and private properties, another one comes from the limit of urban areas, the perimeter of archaeological restraints is very important, and finally the perimeter of the ancient architecture and its pertinence. In these cases, architects should design their composition within a complex framework, and not as a single meaningful subject. If the project normally consists in the elaboration of an architectural figure within a given frame, in this case the design exercise consists rather in the development of a complex system of frames inside an existing framework, the archaeological site. Usually ruins look like an incomplete figure, a partially obliterated picture, and herein the project should develop an *independent relationship* with the past avoiding any historicist mimicry.

The correct way for an architect to walk on a *classical soil* is to design the limit of the ancient site as a contemporary place. In addition, the design of an architecture within the ruins highlights the sustainability of pre-capitalist architecture, which can be opposed to most contemporary architecture. From Vitruvius to Alberti, from Michelangelo to Bernini, the envois of the *Prix de Rome*, Schinkel, Louis Kahn, Le Corbusier, Libera and Quaroni, most important architects have dealt with archaeology within their work: archaeology offers a *catharsis* for contemporary architecture; it is not a place where to bury *ancient* or *modern* repeatable styles. Designing the space between the city and an archaeological site therefore provides some educational tools to guide future designers even in small historical centres (Strappa, Carlotti, and Camiz 2016). Herein the same *silent poetic* and balanced relationship between foreground (historical context) and background (contemporary project), can reasonably be replicated and experienced with the specific purpose of reconstituting a formal relationship between the context and the contemporary design process.

Different design groups, coordinated by the writer, have adopted a general strategy specification to design some small projects; all the proposed interventions follow the sustainability, and the design principles defined by Cesare Brandi, i.e. *reversibility, recognizability, compatibility*, *minimal intervention* and the partial image reintegration. (Brandi 1963). The project completes the formation process of the anti-nodal Eastern special building as the monastery complex is. We considered the ancient monastery as a living organism to be continued by a new addition, the project therefore, using contemporary materials such as steel, stone and wood, replicates the same measure of the bays of the monastery so to develop the addition. We designed the elevation of the new composition to extend the fundamental lines of the ancient monastery: ground line, base, elevation, connection and conclusion lines were continued in the new composition, strictly avoiding any *mimesis* of the ancient buildings, and continuing the same

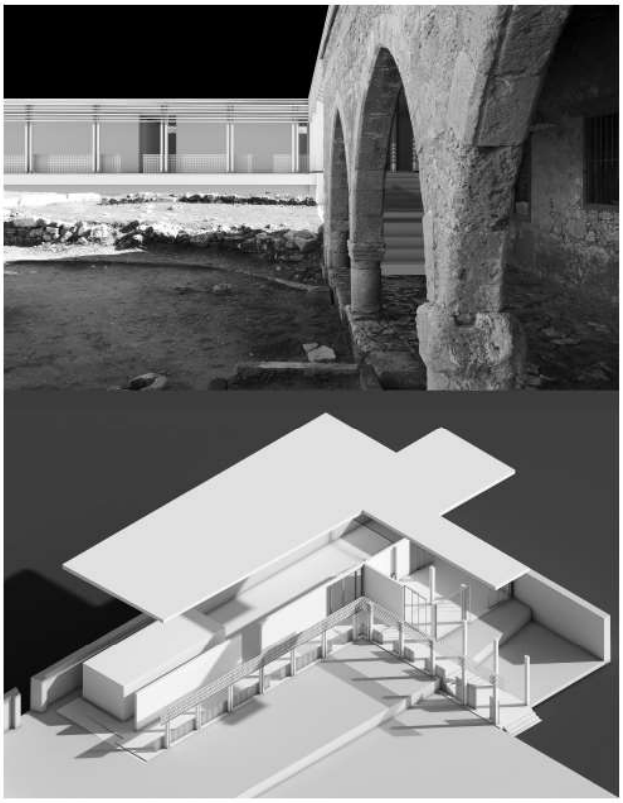
Figure 2. The formation process of the project, A. Bruccoleri, Reading and designing: *San Polo dei Cavalieri*, Master Graduation thesis, Faculty of Architecture, "Sapienza" University of Rome, rapp. G. Strappa, co-rapp. A. Camiz, 2014

organism started with the construction of the ancient church. The nodes where the new architecture encounters the old buildings are the crucial part of the design operation. The addition completes the living organism of the monastery, avoiding strictly any kind of aesthetical contraposition. Neither touching the old building, or bearing loads on the old walls. The new building is thus recognizable as another part and a different piece of a composition that shows even today and unique character. The distributive system of the complex, expresses the continuity with the past by granting full accessibility to all the parts, even for people with disabilities.

Conclusion

Within the workshop, we compared different definitions of landscape: the one given by the European Convention of Landscape, "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors»" (EU, 2000), and that provided by Emilio Sereni, "the form that man, in the course and for the purpose of its agricultural production, consciously and systematically gives to the natural landscape" (Sereni, 1961), (Camiz, 2011). The discussion questioned if the landscape design should be a conscious material transformation of a living organism, or an aesthetically oriented manipulation of an in-animated object, and then proposed strategies for the education of conscious communities that can guide the transformations so not to follow only speculative interests. Following these premises, we conceived a garden within the monastery of *Acheiropoietos*, inspired to Walafrid Strabo's poem. The *Hortulus* was composed in Latin in the IX century using hexameters to describe the monastic garden

Figure 3. The formation process of the project, C. Camerota, A. Venneri, E. Vizioli, Architectural reading and design of the continuation of the Acheiropoietos Monastery, tutors: A. Camiz, L. Ferroglio, International design workshop/Graduation laboratory (Architecture and Restoration) Reading and designing the area of Lambousa-Karavas, Cyprus, 2014, Girne American University, "Sapienza" University of Rome, 2014



of Reichenau. In the poem, 23 different plants are described. These same plants were chosen as a living model for the project. The project uses wooden floor and flowers beds with a self-sufficient irrigation system and green hedges, demonstrating how it is possible to design a contemporary garden, following a medieval model, in an archaeological site, according to the analysis of Urban Morphology, and the principles of restoration described by Cesare Brandi: i.e. recognisability, compatibility, reversibility, minimum intervention. (Brandi 1963). This enclosed medieval garden was designed to host, in one part the twenty-three plants described in Walafrid Strabo's *Hortulus*, and in the other part, a garden dedicated to mint plants. Both of the two parts of the garden were designed, using sustainable materials and very simple technologies, so to propose a possible solution for a compatible, reversible and recognizable design within the site of the ancient Monastery. The continuation of the existing path of the portico was outlined as a system of matrix, implantation and connection routes, so to dispose the flowerbeds containing the plants in a way that simulates the formation process of an urban tissue within the monastery. The result is a continuation of the formation process of the monastery that enhances the site and its history, without imitating the past.

None of the proposed projects will built in reality, but they conceived as the experimental application of a theoretical method. The proposed method, based on the careful examination of each context and its history, recovers the rules of the transformation from the analytical reading of the formation process of the artefact. Through a project, not intended as an *impromptu* academic exercise, but rather as a design experiment, we intend to suggest to the local authorities some possible interventions in the area of the Monastery. The projects represent diverse topics, such as the reintegration of the image,

Figure 4. The formation process of the project, D. Michele Daniele, F. Lofiego, V.D. Matteis, Architectural reading and design of the continuation of the Acheiropoietos Monastery, tutors: A. Camiz, L. Ferroglio, International design workshop/Graduation laboratory (Architecture and Restoration) Reading and designing the area of Lambousa-Karavas, Cyprus, 2014, Girne American University, "Sapienza" University of Rome, 2014

or that of the construction of the margin, but they are all, in different ways, set on the transposition of the Brandi's principles of restoration to the architectural composition. All proposed projects are reversible, recognizable, consistent, and based on the minimum intervention, but finally the resulting picture certainly does not belong to the domain of the restoration itself, but rather to that of architectural composition in archaeological area. In the analysis of the formation process of the monastery, the contribution of urban morphology and architectural typology was essential, so to develop analytically the proposal of an addition to the monastery as the continuation of an ongoing process.

In TRNC the faculties of Architecture offer undergraduate curricula in architecture which usually include only two exams in history of architecture, one theoretical exam in restoration and no elective courses in history, archaeology, restoration and survey. In addition, the different curricula available in the bachelor, master and PhD, do not include any specific option regarding heritage, so no curriculum is available for the future architects, in restoration, history or heritage management. By comparison in Italy most of the faculties of architecture include three exams in history, two studio exams in restoration, one exam in survey and one in heritage in their curriculum, in addition to this there are specific master curricula dedicated to heritage (such as the master in Architecture (restoration) at "Sapienza" University of Rome). Also in Italy, there are a specialization course (post master courses) in restoration, and several PhD programs in restoration, history and survey within the faculties of architecture. Many Faculties of architecture do have a Department of History and Restoration: and before the last university reform, which forced all Universities to aggregate their departments (so to have over 50 members) every faculty had one Department dedicated to history and restoration. In addition to this, following the compulsory professional continuing education that every practicing architect have

to follow, 20 credits per year, some Chapters of Architects (such as the Rome Chapter of Architects) developed specific professional training programs dedicated to heritage. There is a Department of Heritage in the Roman Chapter of Architects, founded in 2008 and directed by Virginia Rossini. In these last seven years the policy that the largest chapter of architects in Europe has adopted (Rome has 18224 registered members. Source: Chapter of Architects President, September 2015) for professional training includes heritage as an important topic.

In the last years seminars, conferences, and workshops contributed in increasing the level of understanding of heritage within registered professionals. In countries with a history of several millenniums of civilization such as Italy and Cyprus, adopting a specific teaching policy dedicated to heritage can increase the jobs available for the new generations, and help the registered professionals to catch up with the many activities the often are offered through tender calls by UNPD and EU.

Today with this situation in education in TRNC there is no option for architects trained in this country to work in the Heritage sector. The professional activities that architects can follow in Heritage, include the survey of monuments, archaeological sites and urban tissues, the documentation of heritage, the restoration, the management of Museums, archaeological sites and archaeological parks, the design of all the above, and also the design of new architectures in historical and archaeological contexts and finally, of course, the historical research. We are proposing here a new direction in architectural education in Cyprus which would affect seriously the job offer in the future, but also help Cypriot architects to participate to heritage design and management outside the island, and with a serious outcome in the perception of heritage in the people, and therefore in the inherited collective memory of the Country.

References

Brandi, C. (1963) *Teoria del restauro* (Edizioni di Storia e Letteratura, Roma).
Bruno, G. (1582) *Ars memoriae* (Gilles Gorbin, Paris).
Camiz, A. (2004) 'Genere ed elenco. Tecniche compositive e significazione architettonica', in R. Panella (ed.), *Questioni di progettazione. L'esperienza del Laboratorio di Progettazione architettonica e urbana 1 del Corso di Laurea in Tecniche dell'Architettura e della Costruzione* (Gangemi, Roma) pp. 102-115.
Camiz, A. (ed.) (2011) *Progettare Castel Madama. Lettura e progetto dei tessuti e del patrimonio archeologico* (Edizioni Kappa, Roma).
Camiz, A. (2014) 'Urban Morphology and Architectural Design of City Edges and Vertical Connections in Historical Contexts', in *New Urban Configurations*, Cavallo, R., Komossa, S., Marzot, N., Berghauser Pont, M., Kuijper, J. (eds.) (Delft University Press/IOSPress, Amsterdam) pp. 227-234.
Camiz, A. (2015) 'Designing contested heritage within the sacred context. The Αψειροποιετοσ Monastery', in G. Verdiani, P. Cornell, P. Rodriguez-Navarro (eds.), *Architecture, Archaeology and Contemporary City planning. "State of knowledge in the digital age"* (Lulu Press Inc., Raleigh, NC) pp. 78-90.
Caniggia, G., Maffei, G.L. (1979) *Composizione architettonica e tipologia edilizia. 1. Lettura dell'edilizia di base* (Marsilio Venezia).
Cataldi, G., Maffei, G.L., Vaccaro, P. (2002) 'Saverio Muratori and the Italian school of planning typology', *Urban Morphology* 6.1, 3-14.
Conzen M.R.G. (1960) *Alnwick, Northumberland: A Study in Town Planning Analysis* (Institute of British Geographers).
EU (2001) *European Landscape Convention,* Treaty Series n. 176, (Council of Europe, Florence).
Guidoni, E. (2006) 'Le piante ricostruttive di città. Inquadramento generale e metodologico', *Le piante ricostruttive dei tessuti medievali e moderni. Metodi e ricerche, Storia dell'urbanistica, Campania*, VII, T. Colletta (ed.), p. 10.
Hesiod. *The Homeric Hymns and Homerica.* Theogony (William Heinemann Ltd., London 1914).

Le Goff, J. (1988) *Histoire et mémoire* (Gallimard, Paris).
Maretto, M. (2013) 'Saverio Muratori: towards a morphological school of urban design', *Urban Morphology* 17.2, 93-106.
Marx, K.(1894) *Das Kapital, Kritik der politischen Ökonomie* (Verlag von Otto Meisner, Hamburg).
Marzot, N. (2002) 'The study of urban form in Italy', *Urban Morphology* 6.2, 59-73.
Petruccioli, A. (ed.) (1998) *Typological Process and Design Theory* (Aga Khan Program for Islamic Architecture, Cambridge, Massachusetts).
Reuss, F. A. (ed.) (1834), *Walafrid Strabo. Hortulus* (J. Stahel, Wirceburgi).
Sereni, E. (1961) *Storia del paesaggio agrario italiano,*(Laterza, Roma-Bari).
Strappa, G., Ieva, M., Dimatteo, M.A. (2003) *La città come organismo. Lettura di Trani alle diverse scale* (Adda, Bari).
Strappa, G. (2013) 'Territorial organism and urban knotting: Design methods for minor centers of Lazio', *Magazine festival dell'architettura* 4.23, 19-26.
Strappa, G. (2014) *L'architettura come processo. Il mondo plastico in divenire* (Franco Angeli, Milano).
Strappa, G., Carlotti, P., Camiz, A. (2016) *Morfologia urbana e tessuti storici. Il progetto contemporaneo nei centri minori del Lazio* (Gangemi, Roma).
Whitehand J.W.R. (2012) 'Issues in urban morphology', *Urban Morphology* 16.1, 55-65.
Zeybekoglu-Sadri, S., Sadri, H. (2009) *Commodification by Conservation: Tourism-led Transformation of Historical Heritage in Istanbul, in Traditions and Transformations: Tourism, Heritage and Cultural Change in the Middle East and North Africa Region Conference* (Centre for Tourism and Cultural and Cultural Change, Leeds).

Chair_Marco Maretto
University of Parma, Italy

Local Networks Forum

Chinese Network of Urban Morphology

Report of the Chinese Network of Urban Morphology

Wowo Ding, Andong Lu
Nanjing University

Abstract

The instrumental role of urban morphology in Chinese urban studies have brought new insights to many issues as well as generated previously unidentified knowledge that in return informs the established discourse of urban morphology. This paper will address four of these kind of issues: (1) the morphological adaptation of socialist plans and layouts in contemporary market economy; (2) the rules and paths of evolution of rural morphology where arrangement of buildings is prioritized to alignment of plots; (3) mathematical description and assessment of compact urban form and its relationship to urban environment; (4) the mediating role of urban form between historical and empirical factors in contemporary context.

The Chinese Network of Urban Morphology was formulated on 31 October 2013 to provide a platform to encourage and communicate the study and application of urban morphology in the context of Chinese-language based academia. During China's unprecedented urbanization since the 1990s, new practical and theoretical questions have been raised. Urban morphology as the science of urban form provides a much needed theory and set of tools for addressing these questions. As a result, urban morphological studies have undergone a marked growth in China, especially since the beginning of the twenty-first century (Figure 1 & 2). Comparing the graph of articles that use 'urban morphology' as keyword with the graph showing articles using the keyword 'urban form', we can identify the evolution of Chinese discourse on urban form into four phases (Figure 3).

The first phase from 1982 to 1993 saw the emergence of 'urban form' as an academic keyword. Some key theoretical works was translated and introduced into the Chinese context, including especially the idea of building typology by Italian architects Aldo Rossi and Massimo Scolari and the studies on good urban form by American urban designers like Allan Jacobs, Donald Appleyard and Kevin Lynch.

The second phase from 1994 to 2001 is characterized by rising concerns over the 'evolution' of urban form and its driving forces and mechanisms. The gradual introduction of the Conzenian theory may be considered as a response to the need of methodology that gives account for the 'evolution' of urban form. In the meanwhile, urban morphology founds its application in the emerging field of urban regeneration and preservation.

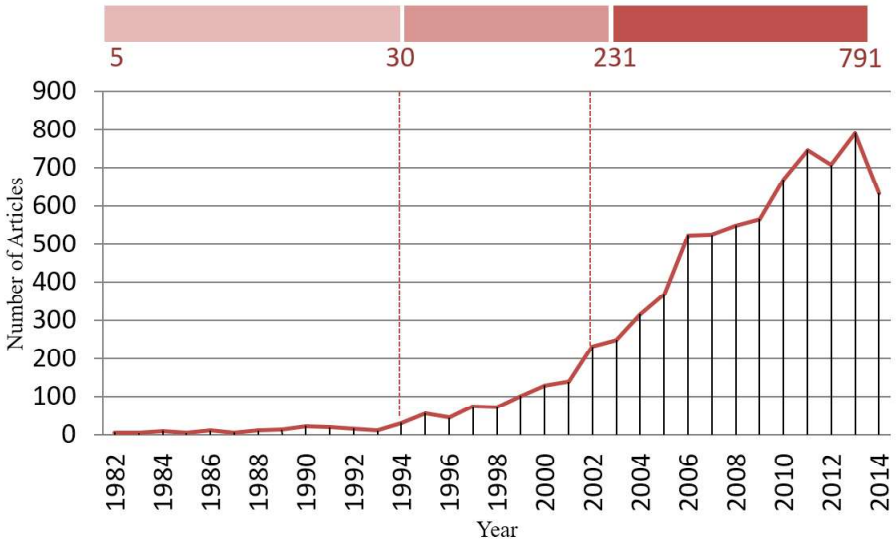
In the beginning of the 21st century, following a decade of rapid urbanization, urban morphology was established as the key method in urban studies and urban design. Several main research fields have been formulated as stronghold for the application of urban morphology: (1) morphological evolution of historic cities; (2) forces & mechanisms of morphological change; (3) quantitative approach to urban form and its elements.

In 2009, the Sixteenth International Seminar on Urban Form on the theme of Urban Morphology and Urban Transformation took place in Guangzhou, China. This further boosted interest in urban morphology and recognition of its relevance to Chinese urban development. In the last few years strong research groups working on urban form have been established at leading universities and a number of English and French publications in the field have been translated.

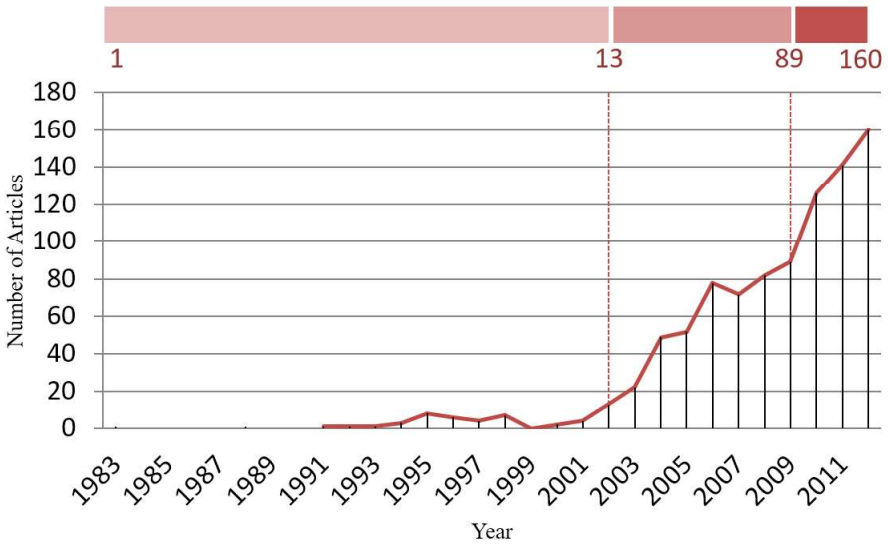
The inaugural seminar on 31 October 2013 was attended by scholars from six Chinese universities, Wowo Ding, Andong Lu and Hongyan Xiao (Nanjing University), Yinsheng Tian (South China University of Technology), Dongqing Han (Southeast University), Feng Song (Peking University), Yong Chen (Tongji University) and Yunying Ren (Xi'an University of Architecture and Technology), as well as Jeremy Whitehand and Susan Whitehand from the University of Birmingham, UK and Kai Gu from the University of Auckland, New Zealand. By September 2015, the number of institutions joined the Chinese network has increased from six to fourteen, including representative from Hong Kong and Singapore.

Members of the Chinese Network of Urban Morphology have agreed in several issues: (1) there is a crucial need for establishing urban morphology as a core theory for urban design; (2) the findings of urban morphological research need to be utilized much more efficiently in practice; (3) to lay a solid foundation, it is essential to build up an integrative terminology and methodology of urban morphology in the context of Chinese language. Several new research fields stemmed from Chinese urban conditions have been opened up that challenge the tradition research caliber of urban morphology: the morphological characters of the compact city; the correlation between urban form and micro-climate conditions; urban form and the issues of sustainability and resilience in rapid urban transfor-

mations, etc. Based upon these considerations, the Chinese Network of Urban Morphology is preparing for the 23rd International Seminar on Urban Form (ISUF 2016) with the theme 'Urban morphology and the resilient city' in order to promotion of the study of urban form in China and to feedback these emerging issues into the knowledge base of urban morphology.

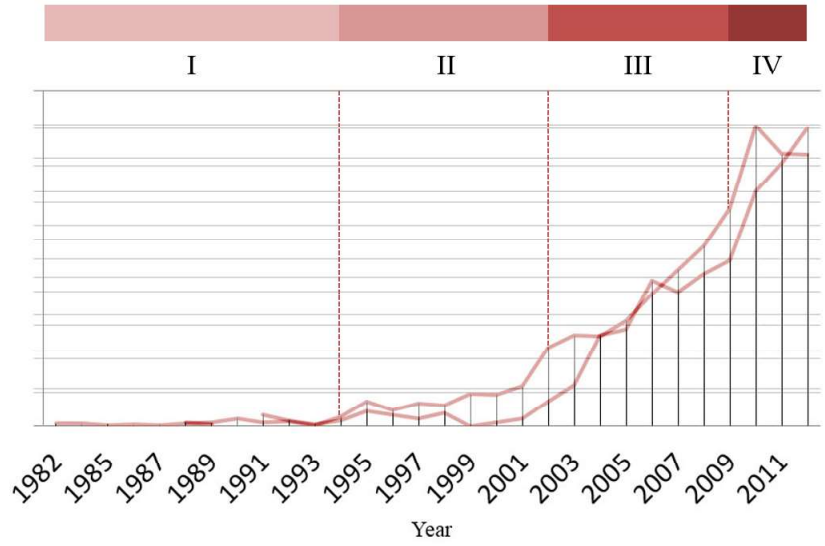


Articles using 'urban form' as keyword per year（www.cnki.net）



Articles using 'urban morphology' as keyword per year（www.cnki.net）

The evolution of Chinese discourse on urban form: **4 phases**



Collaged graph of articles using 'urban form' and 'urban morphology' as keyword（www.cnki.net）

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Italian Network of Urban Morphology (Isufitaly)

The italian approach to design. Learning from the building fabric. The case study of Trastevere

Paolo Carlotti
DiAP Department of Architecture and design, "Sapienza" University of Rome, 53A, via Gramsci, 00197, Rome, Italy

Abstract

The notion of process is based on the belief that urban design and design of the building fabric are nothing more than the result of arranging developed and orderly human structures within a sequence which progresses from the incipient form to the contemporary layout. Progressive humanisation of the territory with constant, mutual adaptation of the parts with regard to the whole. Picking up on some key elements in western geographical thinking, Muratori and Caniggia laid the foundations of the notion of process and type, and started to single out the all-important working insruments for interpreting historic architecture and fabric. Rome's school of urban morphology, which has examined these observations more closely in recent decades, puts forward the question of design in historic fabric as one of the fundamental paradigms of the contemporary city. Design must interpret the process of transforming the fabric as one of the key factors for understanding the essence of architecture in its ongoing transformation and specialisation as regards urban organism and type. Making changes to the historic fabric, which is the result of congruent and proportionate continuity, entails design aimed at maintaining its vital and cooperative parts; it means proposing an additional adaptation of its parts with regard to the renovated whole and in relations with elements on the upper scale. But it also entails acknowledging in the process of type, the admissible limits and relations found in the dynamic essence of the parts and of the whole. This paper is aimed at reconsidering design in the historic fabric as a project to conserve the essence of architecture, a dynamic safeguard project which takes into consideration the opportunities of specialising and tying together the building type and the historic building fabric. To this end, it offers some interpretation parameters in order to understand the process of transforming the urban system, fabric and type. Parameters which make it possible to distinguish the random from the systematic, episodic transformation from planned transformation, looking on the building fabric and architecture in general as a text to be interpreted in its integrity and in the values that can be found in cartographical signs. Which brings what has actually been achieved three-dimensionally onto two dimensions. Tracing back of the form achieved shows us the essence and synthesis of a process clearly seen in the architecture. The question, currently being examined in greater depth during graduate school studies (coordinated by Prof. Strappa), has generated a consideration regarding the special complex building. A unique organism which plays a specific role in both the building fabric, the re-blending of which it proposes, and the urban organism where it presents itself as a special node.

ISUFITALY was founded with the aim of studying and interpreting urban form and building types as they apply to urban planning and architectural designs in historic and historicised urban fabric. Founded in Rome in 2007, it evolved into its current, more official guise (again in Rome) in 2014, thanks to a group of researchers interested in analysing the planning aspect of urban morphology and who were convinced of the need to compete at an international, interdisciplinary level.

It is one of the Italian school of building typology's most recent contributions, which, with the foundation of ISUFITALY (a scientifically-oriented cultural association), intends to contribute to the international debate by publishing the results of a decade's worth of research, at the same time positioning itself once more within that wider historical and geographic scientific tradition that led to the establishment of modern urban morphology. Such research has evolved with its own particular characteristics in Italy but shares the fundamental assumptions held by geographers, declared with the reformation of the Mittel-European field of geography of the late 1700s. Such work has proved useful for architectural plans and urban designs and is now occupying a number of European and North American university departments of architecture. In 1994, the ISUF was founded in Lausanne thanks to the contribution of the Italian typological school (particularly those of Rome and Florence) and it is since then that, boosted by continuous debate, the practical role of morphological research in architectural plans and urban design has gradually been recognised, developed on the basis of the observations made by the Italian school. Today, morphological research is the subject of in-depth analysis in studies and experiments conducted in the schools of architecture of Rome and Bari.

Research background and prospects

One of the first important contributions to defining urban morphology, particularly in the field of urban dynamics, was that of Carl O. Sauer in 'The Morphology of Landscape' and *Land and Life*, during the period when he was a lecturer at the University of California at Berkeley's geography department (1923-1956).

Sauer was one of the first to describe the concept of a city using the metaphor of an 'organism', a paradigmatic use of the term that clarifies – though not in a biological sense – how that definition, so dear to the heart of the Roman school (but also criticised for years), generally indicates a structure organised in systems and elements with the intrinsic ability to progressively re-compose itself over time.

Many years ago (1991), during a conference in Modena on Saverio Muratori, Manfredo Tafuri took the opportunity to highlight this aporia (Conference Proceedings, 1991). He stated that it was necessary to rediscover the common roots of Muratorian thought in the history of architecture (truth be told, he actually talked of the need to review Muratori's status as a lone figure), maintaining that by reincorporating Muratori's thought and presence in the historical and international scene he would have regained his importance and his place in architectural research.

A commonly held conviction claims that the morphological school's cultural foundations lie in European geographical precepts, in the fundamental premises that Alexander Von Humboldt perceived (that place cannot be separated from human use, and develops from being a natural space to becoming a human landscape) in the concept of cultural landscape as developed by Carl Ritter and then taken up by Otto Schluter in 1908, and who Sauer was to borrow from in his concept of urban morphology: an organic or quasi-organic structure that is made up of elements and systems that can be grouped together in a series.

Sauer himself was later to associate himself with Vidal de la Blache (Sauer, 1923), responsible for the concept of 'cultural region', a particularly fertile concept in architectural research that was to contribute to providing the elements required to distinguish Gothic areas from Roman ones, areas characterised by masonry building techniques from those characterised by flexible wooden building techniques.

Much is also owed to scholars such as Albert Demangeon (Demangeon, 1920), one of the first to consider streets and houses as expressions of a cultural landscape. De-

mangeon paved the way for the study of rural architecture, of building type, which was still considered a model at that time, concepts that would later be resumed by Renato Biasutti (Biasutti, 1925) in Italy during the conference on rural dwellings and later by Giuseppe Pagano (Pagano, 1935) in his *Architettura Rurale Italiana*:

'*…the inventory of rural architecture reveals an immense encyclopaedia of abstract forms and pcreative expressions with obvious connections to the land, climate, economy and technology*.'(Biasutti R., 1926)

We also have Olinto Marinelli to thank for the concept of comparatively analysing geographic types, in geographic field work, an essential part of the study and understanding of the physical phenomena that influence the way man shapes his territory, anticipating human geography studies and studies of human behaviour in different geographic environments:

'*Large-scale maps were not only used to explain terrestrial morphology; they also explained anthropogeographic features. After all, this field's main aim was to search for topographic traces, the marks left by man on the land that, 4those caused by natural phenomena, could be traced on paper*' (Proto, 2012).

There's a concept that Marinelli's research and that of Biasutti and Pagano all share: the comparison of topographic traces that can – he says – reveal the marks left by man on the land with those typological studies on dwellings involuntarily oriented towards the architectural field and architectural planning.

The architect Saverio Muratori (1910-1973), who was completely steeped in this culture, made use of these concepts in his studies of cities. He understood territory as a substratum of the history of the ways man has organised the land's conditions and resources.

Gianfranco Caniggia pondered the writings of Lewis Mumford, as well as those of Lucio Gambi:

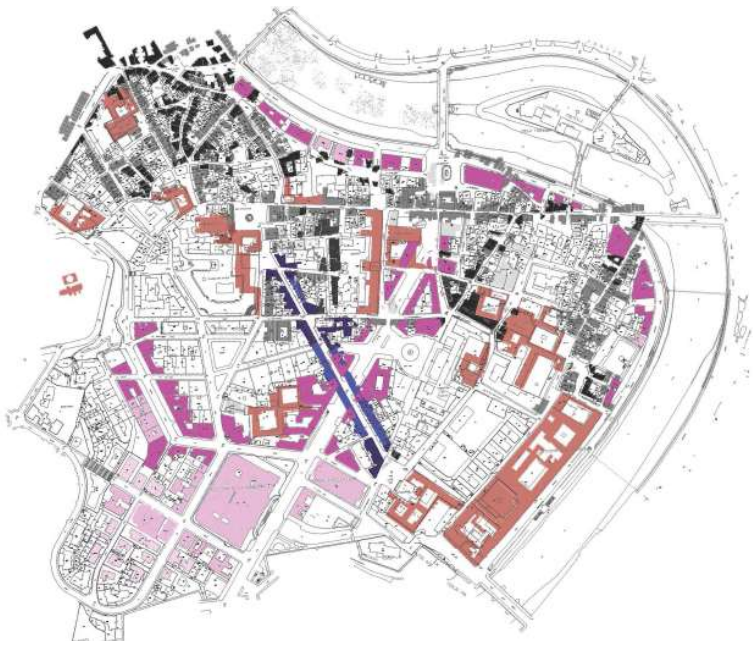
'*...the history of the ways man has organised the land's conditions and resources… And this is the problem that the publications written in the 1960s and '70s address in a variety of ways, publications that I am now reprinting: publications that evolve from an interpretation of geography as the history of a cognitive conquest and a regional development of the Earth, as a result of how society came to be organised*.' (Gambi, 1973) especially as regarded the introduction to the history of Italy that he advised his students to read. He would do this by referring to those environmental situations that he then reinterpreted as relatively independent and analysable systems, particularly as far as architectural expression (language) was concerned, not to mention the intrinsic tectonic characteristics of material, shaped by local culture. Caniggia went on to attempt to include the interpretation of topographic maps (those that Olinto Marinelli had referred to) and it is through such traces and drawings that they reveal the signs that man has chosen to impose on the territory, confirming or denying the existence of a phase in the anthropisation process that was evolving from a simple, random and relatively independent system towards a complex, diverse, organic and complementary system. Above all, Caniggia attempted to understand the architectural meaning of these environmental forms, forms that had evolved from being territory to being landscape, in order to glean guidance for architectural projects.

Architects – which is what Muratori and Caniggia were – are interested in such interpretations for practical reasons. Muratori referred to an 'operational history' (Muratori, 1960) of the interpretation of territory and urban landscape involved in architectural work, something that he was to explain in practical terms in the late 1950s with his *Storia Operante di Venezia* and later with the Roman version of this publication, reconstructing the image of a lost urban landscape from the traces still visible in the geography of the urban landscape, offering them to architects in order to make and transform cities and their architecture:

'*...in studying the urban fabric of Venice and Rome, I have come to understand the laws that govern the typicality of urban forms…*'(Muratori, 1960)

He was to do this by interpreting the signs of secret organicity in topographical maps that would prove essential for reconstructing the hypothetical and formal circumstances of the city's original layout; he was to do this using an architect's tools, redesigning the process that could be recognised in those traces and thus restoring continuity to a past rejected by modernity.

Figure 1. Reading of urban morphology on the present cadastral map



Since the 1980s, the critical success of building types owes a great deal to the ISUF (the International Seminar of Urban Form), which has encouraged a new generation of researchers to tackle the issues associated with the interpretation of urban form. This time they have been freed from the parochialism that is so typical of the Italian architectural field (which judged the formal results of a design project as 'limited' when it did not correspond to the outcome of the typological study, while it highlighted its shortcomings when the design outcome was more directly connected to interpretation) in order to project it onto an architectural scenario where the rules of the past are the conditions determining a design and a contemporary language.

It was in just such a new scenario that the attention shifted in the 1980s to interpretation and to techniques for interpreting the forms that history has bequeathed us. Thanks to repeated comparative studies carried out on town plans, on urban fabric and building types, we have come to understand the documentary value of all the formal manifestations visually portrayed in town plans for the study and planning of cities.

Again, in the 1980s, this kind of formal research on city fabric made headway, something that some people call 'light archaeology', introduced by Caniggia, for studying historic city centre layouts (Bologna-Cervellati), with studies on Milan and Como (1966-67) (Caniggia, 1976); he had tried to involve the Roman school of archaeology in this research when he returned to Rome to teach, a school that was run by Paolo Sommella (1986) at the time, in order to jointly develop a research programme that would lead from cartographic interpretation to archaeological verification and design.

This investigation of forms is now the subject of renewed interest (Space Syntax) from fields investigating cartographic depictions, the orientation of urban roads and the form and the value of property (Conzen, 2001).

It is also thanks to the ISUF that we are now paying more attention to plots of land as the smallest unit of the urban landscape, to their relationship with streets and their gradual evolution within city blocks.

Topographic depictions

Some of the main documents used to study the urban landscape are topographic maps. The history of a city can be summarised in the history of its shape, its perimeters and

its buildings. In topographic maps, we can recognise the elements that diachronically contributed to representing the space and, at the same time, its details and unified essence. Its line, its borders, its constructed perimeter, their form expressed and reproduced on paper all point to a collective product created and moulded over time; such maps diamesically tell the story of acts and facts that have divided up or multiplied the space.

The shape of a plot is the state it has reached: constructed diaphasia, compared to what existed beforehand, that demonstrate the overlapping of forms over time; traces of a pattern that is sometimes larger than what is imposed by a design project and is recognisable because it initiates a new phase that imposes the orientation, rhythm and size determined by routes and hubs that did not exist beforehand.

It is then that a town plan is clearly a diamesic description of a city. Drawing a map is a way of describing facts in a form that has been frozen in time. A topographic map is a linguistic code, more akin to a hieroglyphic than to modern writing, a script that describes a city and that must be interpreted. Town plans allow us to read the complete process that generated the urban form and developed it up until the present day. At the international Franco-Italian meeting at Arc-et-Senans (28-29 October 1985), Albert Levy said:

'… *la forme de l'expression ou forme urbaine peut être entendue comme le langage spatial à travers lequel la forme du contenu est manifestée*' (Levy, 1988).

These forms, which are visible in maps, plot by plot and block by block, and are part of the urban fabric and organism, are the clauses, the phases in their syntactic and grammatical enunciation, they are the verb phrase with its linguistic rules.

Thus the form retains the memory of a road, a courtyard that was later built up, a constructed space that was either demolished or replaced; just as, on other occasions, a road is the final result of a process of transformation, where traces (the oldest and most authentic) are lost in the most secret, hidden part of the architectural plan and covered by more recent structures that have redefined the relationship of necessity (Strappa, 1985) that binds the parts of a constructed urban fabric.

The smallest units of the urban landscape

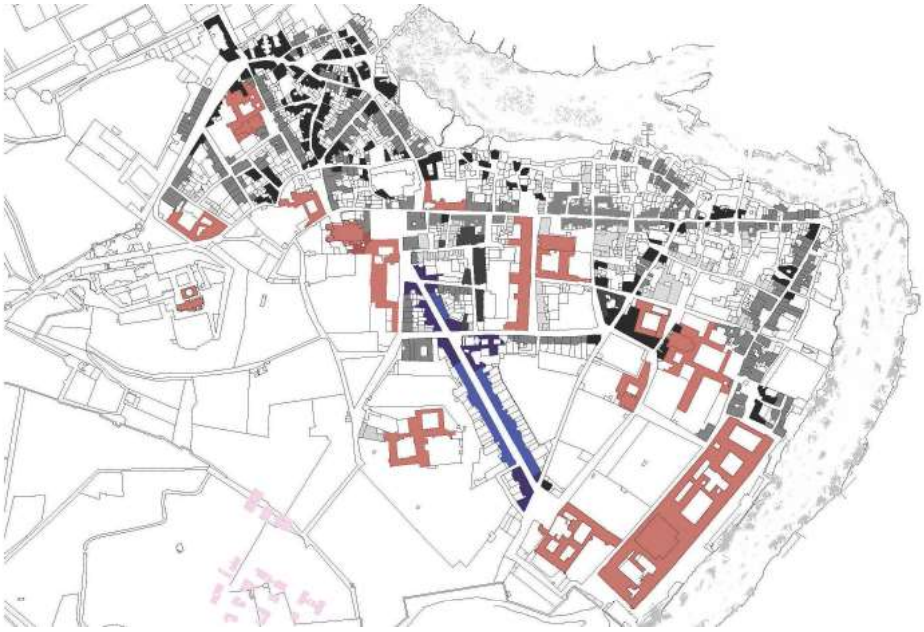
A plot is the smallest topographical unit, its shape is its meaning, as is the proportion of it that has been built on. It is the smallest part of the urban organism and of the process of change, conveyed using another expression and consigned to history.

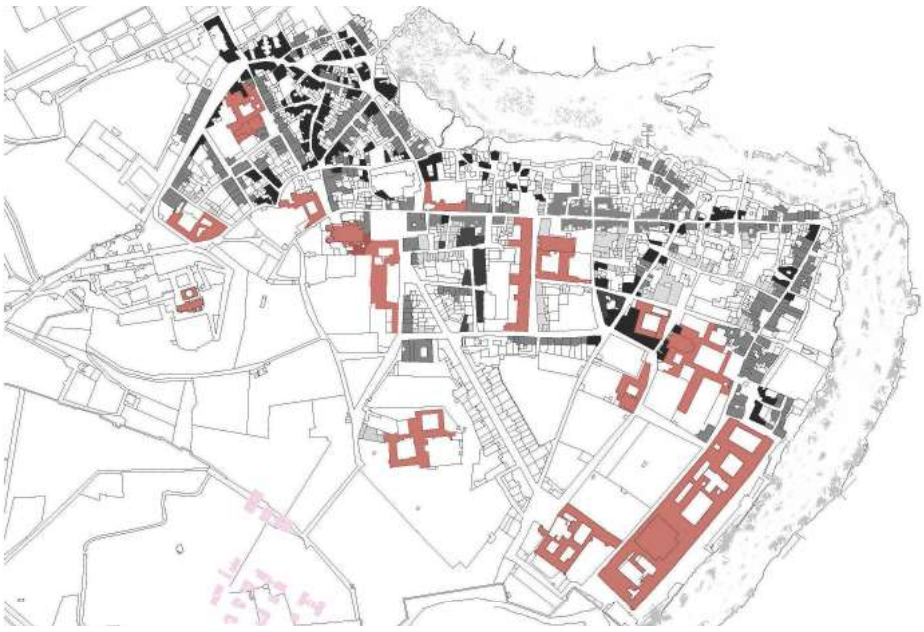
The Conzenian school – says Whitehand (Whitehand, 2014) – had the chance to take advantage of the importance of the morphological period, paying particular attention to the shape of plots, which characterises different periods in history.

Caniggia also studied plots in *Il Progetto nell'Edilizia di Base*, published in 1984. A block and its component parts are described as variants but also as examples of composition, with rules and relationships of necessity that are frequently imposed by routes and streets. A parcel varies in blocks and beyond blocks, often at different orographic levels. In 1976, in *Strutture dello Spazio Antropico*, when discussing older buildings in the urban fabric, Caniggia highlighted how much diagonal and bending streets (Caniggia, 1976) were symptomatic of a constructed substratum that imposed limitations and the resulting architectural diaphasia.

A square, evenly-sized plot tells a different story from an irregular one. In Ancient Egypt, the hieroglyph for 'house' was indicated by a rectangular symbol with a gap. Even now, when we want to draw a diagram of a room, we draw a square with a gap that indicates the entrance. Thus if a map shows an irregular plot, whether it is very irregular or just slightly asymmetrical, this shape will express the history of this smallest parcel of urban landscape, the shape tells us the changes undergone by a plot and frozen in time by its depiction on paper. It tells us to what extent and in what way the plot is the result of a fusion of a number of plots or rather an addition of subsections of rooms, perhaps motivated by the need to extend the space or add annexes of a distributional nature or perhaps merged with older plots that had already been merged in the past and that sometimes occur at the expense of public spaces such as town squares and streets.

Figure 2. Path restructuring: Via di San Francesco
Figure 3. Fringe belt composed of serial special buildings





Urban morphology and masonry structure

Though the layout of masonry structure and the shape of a group of parcels mainly have their *raison d'être* in the relief and orography that characterises a particular place, often – when the terrain features constant, flat characteristics – this reveals the purpose of those who intentionally organised the settlement. Nevertheless, we frequently observe, in the same topographic map, the synchronic formal results of planning decisions as much as physical-orographic limitations.

However, an expert eye will not fail to notice those apparently inexplicable traces of masonry that, though residual, are a coordinated part of the previously existing fabric

and hidden in the confusion of today's forms; those traces of minor buildings, consisting for the most part of simple constructions (of single or twin cells) that, thanks to their private and serial nature, have preserved their shape.

In order to interpret an urban fabric effectively, we need to start by highlighting its masonry's perpendicular structures, structures that belong to the same system of Carthesian axes, and move on to overlap it with the interpretation of land registry parcels. By repeating this procedure on different perpendicular systems and paying particular attention to the size of different plots, we can identify what bands each system of plots belongs to and thus identify the master routes or redeveloped routes that overlapped them.

The particular relationship of necessity that exists between routes and plots can also be the reason for the specialisation of building type and its internal layout, as Howard Davis demonstrated (Davis, 2009) in his interesting book on commercial and residential buildings, which discusses the different uses of terraced buildings in the cities of New York and Tokyo compared to those of Amsterdam. The function of terraced houses in New York, where they have preserved their traditional nature as terraced homes above shops, in plots distributed along the streets that run perpendicular to Broadway, is significant, while larger, non-residential plots are found in the part of a block that directly faces Broadway (central route); an unusual and contrasting characteristic compared to what he observes in the blocks of Amsterdam's historic fabric, which feature larger shop plots along roads that lead to bridges (Davis, 2009), while those that line the canals are more typical of a fabric of secondary importance.

Interpreting urban fabric: Trastevere

Rome's western hill, the Janiculum – the one the Etruscans dedicated to Janus, the god of new beginnings – is a hill that has always dominated the city's history and circumstances. From the top of its c.100 metres above sea level, the Janiculum was on the border of Etruscan territory, on the site of the ancient settlement of *Ianiculum*, which played a particularly important role in guarding the ford that crossed the Tiber River, beyond which the migrating hordes of ancient Latium congregated.

Legend has it that Romulus was the first king of Rome. History confirms that the Romilia tribe (M. Humbert, 1978) controlled the entire hillside area along the right bank of the Tiber from the Vatican field to today's Porta Portese.

In various different ways and in different eras, this area's natural morphology – much more rugged that what is found to the left of the river – was more challenging for those wishing to settle it than the area to the east of the river. Due to the lay of the land there (Carlotti, 1995), these hillsides acted as a border, a margin, both as regards the Janiculum and the hills further to the west.

The Via Aurelia Vetus was one of the oldest hilltop roads in Etruscan territory; it crossed an area from the border of Umbria to the ford across the Tiber. Some believe this crossing was located near Tiber Island while others have pinpointed its site slightly downriver, where the Tiber widens and slows its course, making it easier to cross.

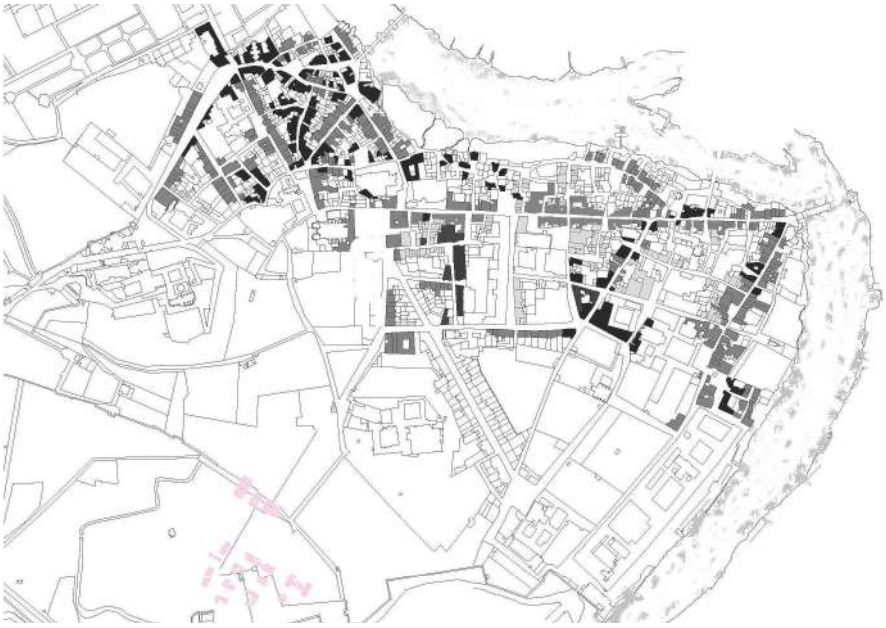
This was perhaps the first of the master routes that dominated the layout of this part of the city right from the beginning, and over time was to intersect with another master route (at the bottom of the valley) – the Via Portuensis – that in leading to the mouth of the river determined the orientation and organisation of the port area of the land and construction layout of Rome's Trans-Tiberina district, the area on the far side of the Tiber.

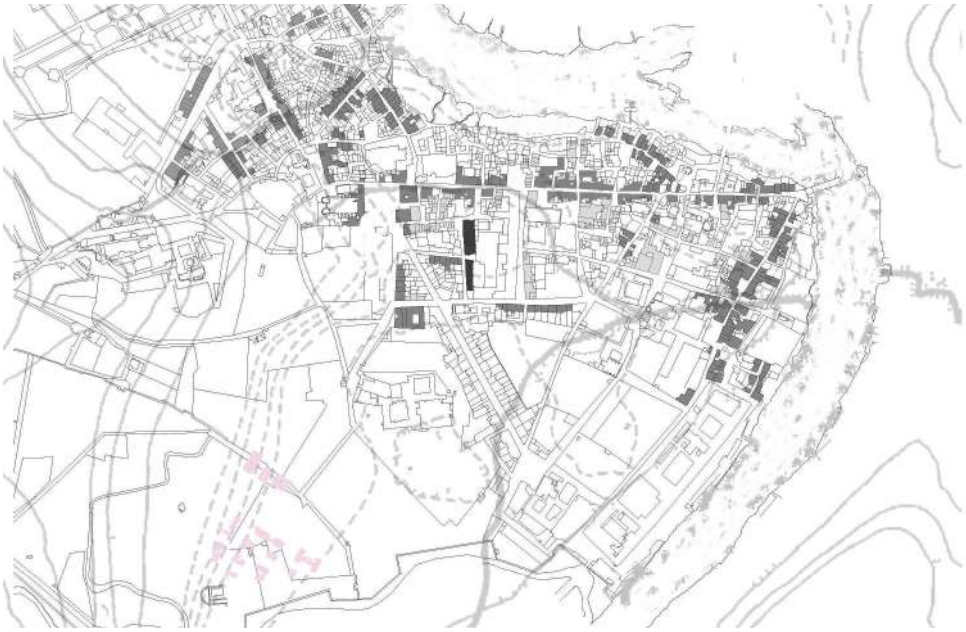
We can only examine these two main axes – the Via Aurelia (third century B.C.) and the Via Portuensis (first century A.D.), master routes of the settlement beyond the Tiber – in their original form after having eliminated topographic additions found along the strips of areas that have been subject to redevelopment, strips that time has placed on top of the older layout.

When we examine the shapes and sizes of plots, we immediately notice the irregular geometric patterns (plots obtained by redeveloping the urban fabric) that are found along Viale di Trastevere in the area between Piazza Sidney Sonnino and Viale Trastevere where it reaches Nuovo Regina Margherita hospital.

It is easy to see how this irregular fabric is the result of the way Viale Trastevere cut across

Figure 4. Infilling urban fabric
Figure 5. Matrix and plant paths





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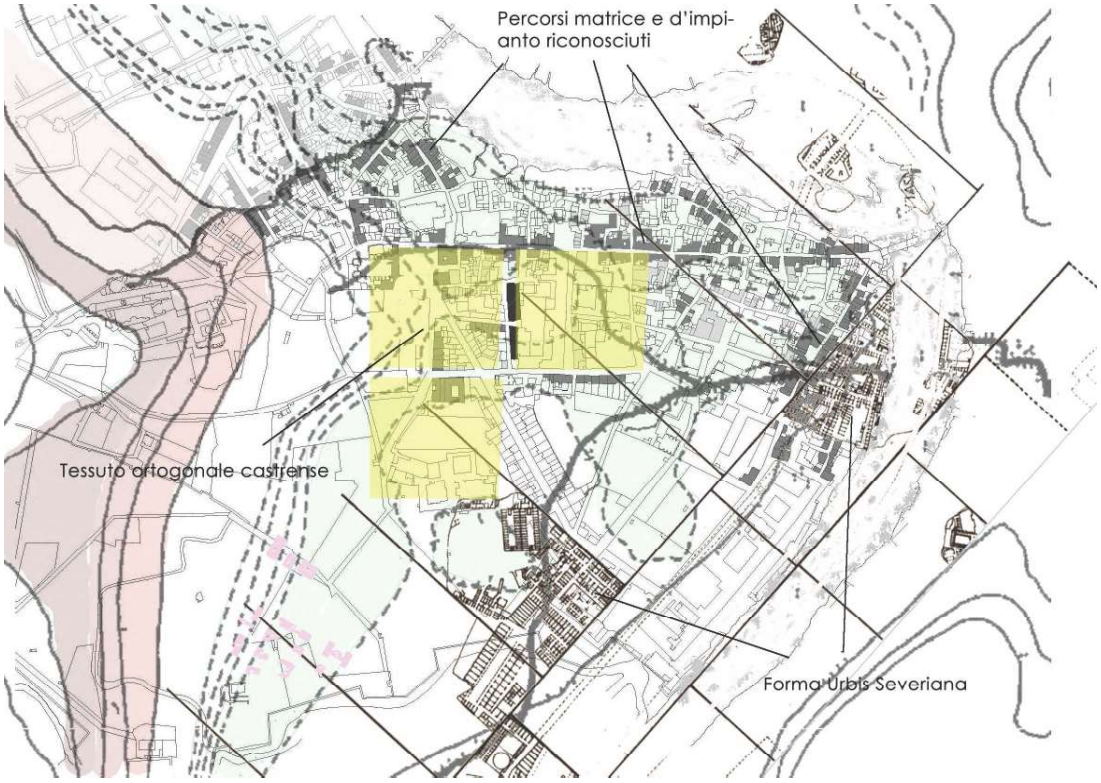
the previously existing layout, a modification that proved necessary in order to connect Rome's old railway station to the city centre, with the resulting reconfiguration and re-fusing of plots along the area affected by the new road. The new layout created beyond the Nuovo Regina Margherita hospital is, in contrast, laid out according to rules imposed by a typological process, organised hierarchically, along the master route (Viale Trastevere) and the planned building routes (Viale Glorioso, Via Tavolacci, Via di Porta Portese etc.) that formed later, in the nineteenth century, along this new stretch of Viale Trastevere.

Now, if we place a survey of Trastevere's masonry fabric over the town plan, we can distinguish different building types that originally determined the shape of each plot and thus guess at their temporal sequence.

Figure 6. Overlap between Forma Urbis Severiana and the map of matrix and plant paths



The largest plots are those associated with apartment blocks, while the smallest plots maintain their original terraced or pseudo-terraced nature. Next we can see, similarly, the layout of plots located along the edges of Via di San Francesco: unlike Viale Trastevere, this road was designed to connect two of this district's town squares, which are however separated by an undeveloped space. Piazza Santa Maria in Trastevere and Piazza di San Francesco a Ripa are the main hubs along the old master routes (Via Aurelia and Via Portuense) that were connected by the new Via di San Francesco road.

If we take another look at the shapes in the town plan along the edges of the San Francesco road, it's easy to see a similar situation to the one noticed in Viale Trastevere. There's an initial stretch within the older urban fabric that features irregular-shaped plots and a second, relatively more external and modern stretch that instead features the typical pattern of fabric organised along main axes and planned building routes. It is easy to see that, unlike the plots along Viale Trastevere, those along the edge of Via di San Francesco are generally smaller. In this case, as before, if we place the urban fabric over the town plan, we can recognise apartment block building types obtained by the merging of terraced housing and designed from scratch in the more regular, even section, as a well-developed apartment block type.

If we exclude the redevelopment caused by the Viale di Trastevere and San Francesco da Ripa roads from the private urban plan, we end up with the image of an urban fabric that is almost entirely made up of perpendicular roads that only occasionally have preserved short stretches of redevelopment.

These are random modifications of limited extent that are perhaps older (judging from the size of the plots) and made up of plots occupied by terraced buildings for the most part.

If we discard small redeveloped roads from the town plan, the layout of the older Trastevere area becomes even more obvious.

Morphological interpretation in historical map comparisons

A comparison of the many historical maps of the city of Rome (from Bufalini's map of 1551 to Falda's map of 1676, right up to the Nolli map of 1748) confirms the temporal sequence we can perceive when interpreting the city's urban fabric.

We can easily date the moment when the Viale del Re road (Viale di Trastevere) cut across the district and the Ministry of Education building (Cesare Bazzani, 1912) was constructed along Viale di Trastevere. We can recognise that date using morphological analysis because it is linked to relationships of necessity with Viale di Trastevere, in that it is a master route, just as Palazzo degli Esami – designed by Edmondo Del Bufalo, again in 1912 ¬– and a more recent building – the former G.I.L. building by Moretti (1936) – are linked to relationships of necessity with the planned building route of Viale Induno.

A comparison of maps dating from before the Unification of Italy (the Gregorian Cadastre of 1818-20, Nolli and Bufalini's maps, as well as views of Rome such as those of Du Pérac in 1577, Cartaro in 1576, Maggi in 1625 and Falda in 1667) confirms the role of redevelopment played by Via San Francesco a Ripa, constructed and later built up from 1576 to 1667, a process that established new relationships of necessity within the urban fabric that in turn imposed new hierarchies on existing roads.

Similarly, old illustrations and archaeological documents regarding third-century Rome (the Severan Marble Plan) confirm how the pattern of the urban fabric was influenced by the master plan that established Trastevere's compositional rules and urban layout.

References

Biasutti R. (1926), 'Per lo studio dell'abitazione rurale in Italia', (tipografia M. Ricci, Firenze).
Caniggia G. (1963), 'Lettura della città di Como', (Officina Poligrafica Laziale, Roma).
Caniggia G.(1985), 'Strutture dello spazio antropico', (Uniedit, Firenze).
Carlotti P.(1995), 'Per lo studio del processo di trasformazione del territorio romano', (esagrafica, Roma).
Conzen M. (2001), 'The study of urban form in the United States', in *Urban Morphology*, 5(1), 3-14;
Davis H. (2009), 'The commercial-residential building and local urban form', in *Urban morphology*, vol.13, n.2, 89-104.
Demangeon A. (1920), 'L'habitation rurale en France. Essai de classification des principaux types', dans *Annales de géographie*, tome 29, n° 161, 15 septembre 1920, 352-375.
Gambi L. (1973), 'Una geografia per la storia', (Einaudi, Torino).
Humbert M.(1978), 'Municipium et civitas sine suffragio, Municipium et civitas sine suffragio. L'organisation de la conquête jusqu'à la guerre sociale', (École française de Rome), Vol. 36, 54-57.
Levy A. (1988), 'Forme urbaine, tissu urbain et espace public', in Merlin P. (ed.) *Morphologie urbaine et parcellaire,* (CNRS, Saint-Denis).
Muratori S. (1963), 'Studi per una operante storia urbana di Venezia', (Istituto Poligrafico dello Stato, Roma).
Muratori S., Bollati R., Bollati S., Marinucci G.,' Studi per un operante storia urbana di Roma', (Consiglio nazionale delle ricerche Roma).
Pagano G. (1935), 'Architettura rurale italiana', in *Casabella*, no 96, 1935
Proto M.(2012), 'Per una storia del pensiero geografico in Italia (1900-1950)', in *Projet de paysage*. URL : http://www.projetsdepaysage.fr/fr/per_una_storia_del_pensiero_geografico_in_italia_1900_1950
Sauer C.O. (1925), 'Land and Life', (Berkeley, University Press)
Strappa G.(2010),'Il tessuto come testo', in Carlotti P., *Typological studies about the Apulia's"Palazzetto"*, (Polibapress, Bari), 4-7
Strappa G. (1985), 'L'unità dell'organismo architettonico', (Edizioni Kappa, Roma).
Whitehand J. (2014), 'British Urban Morphology: The Conzenian Tradiction', in *Urban Morphology*, Architectural Typology and Cities in Transition, (Science Press, Beijng), 18.

Serbian Network of Urban Morphology

Contemporary architectural and urban design practice in Belgrade and Serbia through the perspective of urban morphology approach

Ana Niković, Božidar Manić, Vladan Đokić, Mirjana Roter Blagojević
Institute of Architecture and Urban&Spatial Planning of Serbia, Belgrade, Serbia
Institute of Architecture and Urban&Spatial Planning of Serbia, Belgrade, Serbia
University of Belgrade – Faculty of Architecture
University of Belgrade – Faculty of Architecture
Keywords: urban morphology, urban design, Belgrade, Serbia, urban and physical structure

Abstract

By analysing the contemporary architectural and urban design practice in Belgrade and Serbia the challenges in urban development can be identified and explained through the perspective of an urban morphology approach. The majority of these challenges are as a result of an inadequate relationship between different scales of professional interventions in built environment, as well as, an ineffective relationship between theory and practice. It should be noted that due to these challenges in urban development, the role of architects and professionals involved in urban designing and planning has been questioned. The findings indicate an emerging belief for the need for improved dialogue between professionals in relation to urban development in Serbia, as well as, interaction with wider professional networks. The general issues have already been expanded upon through the discourse of urban morphology and can result in the drafting of guidelines for further improvement of designing and planning practice in Belgrade and Serbia. The principal issues the urban morphology network in Serbia would be faced with are: consolidating up-to-date research and contributions; translating the key references and Glossary present within the Urban Morphology discourse; integrating theoretical and applied knowledge - developing a common morphological language – as a conceptual framework applicable to various typologies and urban tissues; providing a better understanding of the complex phenomenon of urban form; and introducing the morphological dimension to plans, that is, the concept of form into planning.

Introduction

In urban morphology theory the orientation toward its practical application in planning and designing is one of the main concern. The issue of linking urban morphology research and planning practice has strong roots within International Seminar of Urban Form and Urban Morphology journal that has been continuously publishing the contributions related to this topic through examinations of relevant examples in different environments. In that respect, an attitude has been developed according to which the modification and conservation of the existing forms, as well as the production of new urban forms, should be grounded on the knowledge and understanding of the existing built environment, its specific forms and previous development. Although this basic standpoint of urban morphology has become common attitude and elementary requirement for practice - in reality it usually remains without response (Whitehand, 2013). Art McCormack notes the problems of lack of cultural identity and meaning in historic areas, as well as the general lack of coherence of urban form in the cities. He points out to the practice of 'forming and informing' as an imperative in the urban morphology (McCormack, 2013). He advocates the idea that knowledge about urban morphology should be linked to the techniques of urban conservation, urban expansion and urban retrofitting, which is becoming especially important for peripheral zones in which the lack of clarity and coherence of urban form is observed. Ivor Samuels points out to the typo-morphological approach as a framework that integrates the knowledge of urban morphology and provides considering of the three basic topics: the practical use of morphological theory, regionalization of urbo-morphological researches and communication of urban morphology knowledge between different disciplines and geographic environments (Samuels, 2008).

The identified problems in the development of the built environment in Serbia can be associated with the inadequate introducing of the concept of form in planning in terms of guiding of physical structure development. Although recommendations from the field of theory and studies exist, they have not been yet recognized by the professional practice. An explanation of this situation that comes from the discourse of urban morphology which can be applied in the specific context Serbia is the gap between two cultures that are associated with the built environment and a distinction of the ways which they communicate: one that is associated with the practice and act on the institutional framework and prescribed procedures and the other - the academic circle acting within their theoretical fields (Barke, 2015). In this regard it is necessary, through this prism of urban morphology, which primarily considers the relationship between the urban processes and relating urban form, to highlight the two important aspects of the topic: the characteristics of the contemporary architectural and urban planning practice in Serbia, from one side and the up-to-date considerations and recommendations concerning the observed problems, that come from scientific and professional literature and can be connected with urbo-morphological discourse, from another.

Specific context of belgrade and serbia – challenges in urban development

The context of planning in Serbia has been characterized by challenges of transition from former rational model of planning to collaborative model which came along with the shift of socio-economic system in 1990s (Lazarevic Bajec, 2009). Beside all other key elements of market oriented and democratic society that Serbia became, that are crucial for the introducing of contemporary model of planning, there is a need to revise the form of plan which reflects the key demands instead of rigidly relying professional practice on the formal system of planning.

Through analysis of contemporary practice in Serbia by using urban morphological lens we can identify problems which can be subject of urban morphological 'curing', which we systematized as the consequences of: one-sided approaches, overgeneralized approaches, uncritical applying of imported models and partial interventions in the existing urban structure.

A. One-sided approaches characterized the modernist planning concepts devel-

oped after second world war and are predominantly recognized by its tendency to give primacy to technical and functional criteria in decision making processes. New Belgrade is Serbian contribution to developing cities following the functionalist principles of the Athens charter. As similar cities, it has been criticized on the base of lacking urban complexity and vitality that contributed to the absence of visual, perceptual, social and experiential qualities of the space.

B. Overgeneralized approaches neglect the specificity of the developing location by automatic transferring the building rules and guidelines from the plans of higher degree. That can lead either to a chaotic image of the city, having that this approach allows for various interpretations, using and misusing of planning guidelines, or to monotony and standardization, in the case when the very narrow rank of building types is applied in realization.

C. Uncritical applying of imported models either from the past or from other environments can be observed in the recent urban transformations. In the case of introducing the models from the past, that may result in urban areas that have human scale and the positive qualities of traditional cities, but do not correspond to the contemporary context and demands of modern society - finally they do not represent innovation and improvement of modernist concept, but rather an anachronism and very often - technical obstacle.

D. Partial interventions at the level of city blocks represent a special problem in Serbian cities and towns. The analysis of contemporary transformations of Belgrade's urban structure reveals the two characteristic forms of this issue - on the one hand we encounter the process of inert in-filling of the empty spaces in the open-block structure typical for new settlements, especially New Belgrade. On the other hand, we have the process of 'plumbing' in the densely built fabric of the inner city center, which subsumes replacing or upgrading the existing physical structure of the block in order to intensify and densify land use in the block. The particular area delineated by the plan boundary or plot boundary is most often planned and designed without taking into considerations which consequences – functional, environmental, esthetic can be expected in wider context and on higher scales of urban entities.

Due to these problems in urban development, the position of architects and professionals involved in urban designing and planning has been questioned. This culminated in the case of Belgrade's waterfront where various professional consultations and meetings have recently been carried out. A common feeling has developed for a need for better dialogue between professionals in relation to urban development in Serbia, as well as interaction with wider professional networks. What was observed during these consultations is that various professionals are speaking on similar topics, but use different discourses and concepts, which can sometimes lead to misunderstandings, although the final goal is the same – how to protect our built environment from the pressures of investors and other interested parties and how to ensure a balanced urban development where the position of professionals as coordinators would be clearly recognized. Although the recommendations from the field of theory and studies exist, they haven't been yet recognized by the professional practice.

Recommendations from up-to-date researches and studies in serbia

In professional literature in Serbia, there has been noticed a problem related to the scant relationship that exists between different levels of design and planning, as well as to the need for new approaches and methodologies. In these contributions, issues of typology, topology and morphology are primarily related to more comprehensive investigation of the current state, according to the assumption that future urban development can be characterized more as a transformation of the existing urban tissue than as further expansion of territory, which corresponds to the tendency towards more compact, sustainable development (Milenković, 1994). In that term, the building rules as obligatory element of plan content are recognized as the key element of connecting planning and designing procedures with resulting urban form.

For Perović, traditional city elements - urban block, street and square - are major elements both in building new cities and in the reconstruction of the existing ones. They ensure the formation of a 'clear urban form', which is necessary for both technical functioning and visual legibility of urban entities. The city block is considered as a basic element of urban structure which reflects the differences in structure of specific urban entities and represents the backbone of a comparative analysis of historical urban tissues and new, planned settlements. Reduced to the level of the block as a representative sample of urban structure, the control instruments for growth, development and transformation are proposed, such as - horizontal and vertical regulation, inner regulation, the treatment of plots and the way they are utilized, and a general balance of built-up and unbuilt areas of a city (Perović, 2008). Further studies note that in its emergence, formation and contemporary transformations of urban and physical structure, the central zone of Belgrade, its block structure and types of blocks typical for certain parts of urban area plays an important role. Contemporary transformations of urban structure manifest themselves at the level of the city block, leading to deviations from recommended parameters of development, so it is necessary to reconsider the types of city blocks in Belgrade's urban structure, models to which they should strive, the procedures in the form of interpolations in their reconstruction, and the ways in which guidelines are formulated and incorporated into plans (Marić et al., 2010).

Parallel studies which should be taken into account when planning but are not - having its non-obligatory legal dimension - show more concern about the effects of building and show potential for integrating morphological approach into practice. Namely, it has been noticed the negative effects of process of globalizations on its traditional morphology and building typology. Besides buildings which are considered as cultural goods there is raising awareness that attention should be payed also to vernacular architecture which makes the most of the building stock and contributes to the positive ambiental values of city space (Roter-Blagojević, Nikolić, 2008). For example, in the study for Kosančićev venac, one of the oldest part of the historical city core in Belgrade, which is covered by the high level of cultural protection, the approach based on recognizing the problems is proposed. That subsumes reevaluating of all existing physical structure according to the criteria of promoted goals and proposing the developmental scenarios which allow for introducing more flexible use of existing structures under protection (Folić et al., 1997).

By examination of master planning documents for Belgrade, the principal conclusion reached was that by applying urban morphological methods and concepts to plans, its morphological dimension can be achieved (Niković et al., 2014). In the case of the Master Plan of Belgrade 2021, it was concluded that a more cohesive relationship between the promoted goals and plan elements was required. If the goal is preserving character and the identity of urban areas than more attention should be paid to introducing plan elements such as, the issues of identification of area boundaries, the key concept and the building rules. As has been observed in recent urban morphological studies, the adoption of typo-morphological ideas becomes of special significance in the case of specific contexts where the importance of foreign models should be recognized, but need to be modified to the local features of the urban environment as well as to the designing and planning procedures that are specific to Serbia.

Conclusion

In Serbia, we can identify current challenges in urban development. They arise from the problems observed by analyzing the urban and physical structure which further imply to the revising the way the built environment is observed, analyzed and guided through planning, designing and building procedures and plan making. Particularly notable is ineffective connection between planning and designing procedures, as well as the problem of defining and applying of building rules which excludes pre-determined solutions and building types. Exposed problems suggest the need for a comprehensive approach that combines theoretical knowledge, urban design criteria based on the analysis of

urban form and that can serve as a starting point for defining conceptual models, which are in the planning process adjusted to the context and the specificity of location.

Through the description of the development challenges of contemporary architectural and urban design practice, followed by the review of the most relevant theoretical consideration of these problems and challenges, we can notice a significant gap between the theory and practice of contemporary architectural and urban designing and planning. While theory can be brought in line with urbo-morphological discourse, the practice shows considerable declination. This discrepancy can be explained by the general issue of difficulties of knowledge communication in urban morphology. But while the urban morphology has consolidated its body of knowledge and traced the route to the practice, specific context of Serbia demands firstly theoretical elaboration and consolidation of up-to-date contributions, developing common terminology and then transferring into the documents incorporated into the institutional and legal framework of contemporary practice - plans, laws, regulations.

References

Barke, M. (2015) Further thoughts on research and practice in urban morphology: a British perspective. *Urban Morphology* 19 (1), pp. 96-99.
Kurtović Folić, N., Bajić Brković, M. and Bazik, D. (1997) Istraživanje fizičkog prostora za potrebe unapređenja rada u planiranju, projektovanju i izgradnji – na primeru područja Kosančićevog venca [Investigation of physical space for the purpose of improving work in planning, designing and building – on the example of Kosancicev venac], *Glasnik društva konzervatora Srbije*, 21.
Lazarevic Bajec, N. (2009) Rational or collaborative model of urban planning in Serbia: institutional limitations. *SAJ*, 1, pp. 81-106.
Maric, I., Nikovic, A. and Manic, B. (2010), Transformation of the New Belgrade urban tissue: filling the space instead of interpolation, *Spatium*, 22, pp. 47-56.
McCormack, A. (2013) Informing and forming practice: the imperative of urban morphology. *Urban Morphology*, 17 (1), pp. 45-48.
Milenković B. (1994) *Pravila građenja [Building rules]* Beograd: Arhitektonski fakultet Univerziteta u Beogradu.
Niković, A., Đokić, V. and Manić, B. (2014) 'Morphological dimension of municipal plans: case study of Belgrade, capital of Serbia', In: Oliveira, V., Pinho, P., Batista, L., Patatas,T. and Monteiro, C. (Eds.), *Our common future in Urban Morphology*. 21st International Seminar on Urban Form. Porto: FEUP, Portugal, pp. 1568-1577.
Perović, M. (2008) *Iskustva prošlosti [Experiences of the past]* Beograd: Građevinska knjiga.
Roter-Blagojević, M., Nikolić, M. (2008) The importance of the preservation of identity and authenticity during the process of urban planning reconstruction of a city-the role of residential architecture of Belgrade in the late XIX and earlz XX century for the formation of character of historical ambiences, *Nasleđe*, IX, pp. 117-128.
Samuels, I. 2008. Typomorphology and urban design practice. *Urban Morphology*, 12 (1), pp. 58-62.
Whitehand, J. (2013) Urban morphological research and practice. *Urban Morphology,* 17 (1), pp. 79-85.

Persian Gulf Network of Urban Morphology

The City is not a Goose

Attilio Petruccioli
Department of Architecture and Urban Planning, Qatar University, Doha, Qatar
Keywords: Global cities, crisis, inequality, affordable housing, historic districts

Abstract

In 1963 Saverio Muratori wrote Architettura e civiltà in crisi, (Architecture and civilization in crisis), where he described the city of the time as segmented, repetitive, non-organic, privatized and selfish[1]*. He presented the idea of crisis with a positive interpretation- as a 'processing in time', and as 'the adjustment effort of a new cycle to ensure in-time operation of organicity'. The book also identified a conceptual solution to the crisis, from the early answers that are part of technicist programs, to the concept of history of the crisis as 'cyclical time of the civic process'. In the same year, at the Roxy Cinema Conference, he called us students, future architects, "puppet designers", producers of images (with a little imagination)*[2]*.*

The city of Doha is briefly analyzed here as an emblematic case of an instant city of the globalized world. The piecemeal nature of its system, the result of technicistic choices, the extreme reduction of the number of housing types to the individual villas; the disappearance of the historic building fabric; together with the crisis of the idea of continuous urban fabric; and the attempt to conceal, with whimsical shapes and iconic architecture, the immaturity of a growing city, are points stressed. Doha, Dubai, Abu Dhabi are cities of the crisis in the sense that they are built overnight exasperating the characters of the crisis. Aspects that are elsewhere filtered through the cultural values rooted in the community, are here transparent. Doha is a laboratory sample.

[1]Muratori, S.*Architettura e civiltà in crisi*, Roma, Centro Studi di Storia Urbanistica, 1963.
[2]Cataldi, G. (ed.). Saverio Muratori architetto (1919-1973). Il pensiero e l'opera, Studi e documenti di Architettura, 12, 5-14

Rhetoric of the un-precedent

An obvious component of instant cities of the Persian Gulf is the advertising style with which the city is offered as a market product: the superlatives, the primacy, and the extraordinary predominate. The modernist heritage, that from the early years of the twentieth century has rejected history, interwoven with real estate rhetoric, underlines the unprecedented and innovative[3]. No one expects that advertising tells the truth, but it ends up dictating a course of action, and several designers a-critically see in it the land of opportunities. Others are offended by the reduction of the city to a consumer product, and launch apocalyptic anathemas, without impact on the reality of the daily practice. Scholars have to find an equidistant path between bootlickers and apocalyptics. If we clear the field from the seven-star hotel, from the ski slopes in the desert, from the restaurants under the sea, in short, from the neo-liberal funfair, the city of the Persian Gulf appears to us in the true reality – that is a segmented city growing rapidly, and a segregated city generating exclusion. It is the city of indecision: the fact that everything is left to the market laws it does not mean being decisive, -quite the contrary.

Let us adjust the perspective, with a reference to history; put things into proportion with the demographics ; and undermine the refrain of the "unprecedent". Doha and other cities in the Gulf are young, immature settlements in progress, in which the alternation between permanence and change is very high, and growth is often induced artificially. This high alternation makes it difficult to produce those processes of metabolism, which are typical of every human settlement[4].

To demonstrate the inconsistency of the theory that focuses on the anomaly of the global city, we mention the background of flows of goods reaching medieval Aleppo, located at the intersection of the north-south caravan route which, from Yemen via the Hijaz oases, ended in that city, where it met one of the paths of the Silk Road that, via Iran, which was aiming from the east in the same direction, and finally the route that converged, on sea and land, the route along the Strait of Hormuz, via Baghdad.

Mamluk Cairo had more inhabitants than London, and to accommodate an unstoppable multicultural immigration had been provided with housing types such as the 'rab', that had nothing to envy the *Ville Radieuse* of Le Corbusier[5];

Siena in the thirteenth century had all the characteristics of an instant city with an unprecedented migration from the countryside. It did foreshadow a future metropolis (the world's gold fixing was determined at that time by the Bank Monte dei Paschi di Siena). The dream vanished in 1334 a real estate bubble determined by the Black Death.

In more distant periods, the plan of the workers' quarters of Tell Amarna remind us that the monster of inequality is generated by the Pharaonic city dream.

Suburbs of no-places

The instant cities of the Persian Gulf are characterized by an initial phase of exponential and quantitative growth, ordered roughly from a master plan, usually carried out by Western consultants, up to date with respect to the Western market production, but with little or no attention to the spirit of the place. In everyday practice, the growth of the city translates into a mechanical transition from two-dimensional and locational planning to the building, bypassing intermediate tools such as local plans or tri-dimensional codes of urban design. Up to now in Doha there is no officially approved master plan, much less a law relating to the

[3]Salama, A. and Wiedmann, F. *Demystifying Doha: On Architecture and Urbanism in an Emerging City*, London, Ashgate, 2014

[4]It is the allegory of foie gras, a goose forced feeding technique, practiced in France. The poor animal is force fed with a disproportionate amount of calories until its liver achieves an unusual size. At that point the poor animal is killed to recover the organ that is monetized in the market. The poor goose and the global city in the contemporary world adhere both to Heidegger's concept of "standing reserve", expressed in the famous article *On Technology* of 1954.

[5]Petruccioli A. *After Amnesia. Learning from the Mediterranean Islamic Urban Fabric*, Bari, ICAR, 2007

aggregate urban scale and urban design techniques. Since 1971 the systematic destruction of all the historical urban fabric that contained the memory of its inhabitants, has accompanied the formation of successive rings of endless suburbs of non-places. They are built upon repetition rather than upon the unit, homogeneous and indistinct, with no visible margins.

An aerial image, taken from inland towards the bay, shows a close up of these endless suburbs and the compounds of individual houses or gated compounds, which are dissected by fast infrastructure, each based on autonomous logic and creating the effect of splintering by segregating the districts of the city . In the background, City Centre is visible- a district built in the image of the financial city. It is a group of towers with strong iconic impact, but devoid of connective fabric at the base, which is occupied by parking lots. This is a highly irrational urban planning decision, even from the point of view of real estate investment, which has annihilated connectivity and walkability which would go at least some way to improving the neighborhood's livability[6].

If we take the issue of mitigation of inequality as a guideline for a different approach, would open up interesting perspectives and lines of research on the cities of the Gulf, including in this paper. It is sufficient for us here to describe three. 1. The problem of decent accommodation for blue collar workers, 2. The problem of affordable housing, 3. The role of the historic districts.

Suitable workers' accommodation

The image of hundreds of workers in South-East Asia that march in close ranks to building construction sites is usual in the cities of the Gulf. The use of low-wage labour involves complex issues, with a strong impact on the entire city and is likely to create deep pockets of social discontent. One side of the coin is the problem of providing decent accommodation for workers, which is better than the fenced and controlled dormitory solution. The other side of the coin is the high concentration of single male workers in central areas of the city which creates embarrassment to families. So far, the solution to the problem, after the first stage was left to the improvisation of employers, is now entrusted to real estate companies. These companies being oriented to a luxury market, they were not r equipped on a practical level, nor theoretically did they go beyond the hypothesis of a gated aggregation of containers.

We must recognize the Qatari government's attempt to solve the problem with the construction of mega cities, such as the 'Labour City' that will host 100,000 blue collars in the industrial area. The project consists of 55 buildings with green spaces, a clinic, mosque and the Interior Ministry monitoring center. The city is surrounded by high walls, closed by nine gates and blanketed with CCTV cameras. The project is a model for other similar projects in the future: Another purpose-built community Barwa to Baraka, is located several kilometres to the south and is expected to house 53,000 residents[7].

This social issue requires a capacity of typological inventiveness that is in compliance with the economic limitations, can solve not only the problem of shelter, but overcome quantitative and serial solutions, including that of decent living. An organic district should favour, instead of building blocks of rooms with one central corridor plan, the introduction of residence clusters with increasingly complex services: the four rooms with kitchen; the eight rooms with a small angle of encounter; upper unity to aggregate a micro-plot of land in which to grow a vegetable garden at a higher level; a cluster that can include an open space where the community can carry out social functions and celebrate their festivities, and so on until it reaches a size which can include a small mosque, first aid, canteen and a commercial operation needs to be around a green space.

[6]I'd rather deal with the problem from the point of view of livability rather than sustainability, as the latter is inflated by commercial applications. For an elaboration on the definitions of livability, see: Timmer, V., and Seymoar, N.-K., *The Livable City*. Vancouver: International Centre for Sustainable Cities, 2006

[7]Kovessy, P. Qatar answers call for better worker housing with new "Labour City" in *Doha News,* Nov. 5, 2015

Figure 1. A sequence showing the formation of the iconic waterfront of Westbay, Doha from the seventies to 2013

1570

Affordable housing

Qatar faces a housing crisis, particularly in the affordable sector, as it increases its population to meet the looming deadlines of its many infrastructure projects. Residential rental costs continue to rise, with recent figures from the Ministry of Development, Planning and Statistics showing increases of more than 7 percent year- on- year .

The developers' oriented to serving the luxury market show little inclination to invest in the sector. Due to an ongoing shortage in affordable housing, particularly in central Doha, many residents live in villas and apartments that are illegally sub - divided[8].

If the crisis affects mainly the lower middle range of foreign technicians, a recent article by Lesley Walker revealed that 15 percent of families, especially young Qatari couples living in relative poverty[9].

The disproportionate cost of land pushes the extreme choice of development- into height, as in Sharjah where residents are huddled in towers and streets are thronged, with

[8](http://dohanews.co/mdps-qatar-tenantsenter--2015 break-rent-hikes /).
(Http://www.almeezan.qa/LawPage.aspx? Id = 3980 & language = en).

[9]Walker, L. "Many Qataris Further falling into debt to two social pressure" in *Doha News*, March 11, 2016

Figure 2. On the way to the old airport an iconic building is overwhelming some private houses

serious congestion of traffic and social alienation. In Doha, experiments conducted by companies such as Barwa Real Estate, based on units of apartment houses of 5-6 floors (an acceptable solution, consistent with market trends), for cost containment reasons did not provide an adequate solution which is open spaces. Among other things, the company after the experiment of Barwa City has left the business[10].

Making small neighbourhoods of high density, recovering the complexity of the open spaces of the pre-oil cities, reducing vehicular traffic impact, and enhancing the walkability

[10]The development comprises 6,000 apartments in 128 buildings. Although the quantity of the facilities is sufficient, the treatment of the open spaces around the buildings is poor..

Figure 3. A view from inland towards Westbay showing the sprawl of the suburbs intersected by highways
Figure 4. A gated compound, the standard residential urban unit

for the residents, with buildings of up to three or four plan types, is a possible venture. Indeed it could be one of the pillars on which to set the anonymous suburbs to promote reform.

An affordable housing experiment, conducted in Studio V at the Department of Architecture and Urban Planning of Qatar University[11], of placing high density, housing in a bottom plate settlement (building mat), of 200 housing units, for households with a revenue between 1000 and 4000 US dollars monthly, produced an interesting model. The

[11]Arct 410 Design Studio V Fall 2015, Department of Architecture and Urban Planning, Qatar University in collaboration with the Department of Civil Engineering.

Figure 5. Accomodationsforf blue collars in the industrial area
Figure 6. Houses in the historic district of Al Asmakh, occupied by low wage workers

separation of vehicular and pedestrian paths, a shrewd hierarchy of the open spaces, divided between private, semi-public (the real meeting spaces such as courtyards common to most united buildings, widening of streets, open platforms etc.), and public, can revive the richness and complexity of the pre-oil city, against the reductive patterns of gated compounds limited to road ratio (and parking) and accommodation.

Typological flexibility of mixed types, including the possibility of recovery of traditional types such as the courtyard house, results in an organic integration of spaces and hierarchical functions, and resolves the contradiction between the demands of contemporary life and traditional costumes aimed at protecting privacy.

Figure 7. The compact fabric of Al Asmakh (left) and Al Najada (right) in an aerial view of the seventies

Detecting the traces of memory

Immediately after independence, the State of Qatar facilitated the transfer of the local population from the centre[12] to the peripheral neighborhoods, resulting in semi-illegal occupation of old houses by a growing population of foreign workers. In the absence of a clear vision on the role of the city centre future, the complete demolition of the historic fabric pieces produced vast voids in the compact city, and its replacement with buildings often deficient in quality-today, thirty years later, totally obsolete.

Following a collective awareness of the historical value of the central areas, accompanied by a desire to cash in on the surplus value of the areas determined by the rapid and extensive expansion of the suburbs, the historic centre corresponding to the two settlements of Al Doha and Al Biddah is become strategic. In the area there are three realities: 1. The Souq Waqif; 2. The mega-project of Msheireb and 3. Several disconnected fragments of historic fabric that wrap around the first, including the Al Asmakh district, Al Barada and the area called Baraka.

Souq Waqif corresponds to the old Souq of the city. It was radically "restored" at the end of the eighties as part of an invented tradition widespread in the Gulf[13]. By virtue of the human scale of the open spaces and commercial buildings it is still the most popular place in Doha.

The second is a sophisticated and expensive urban renewal, conducted wisely as real estate, aiming to bring Qatari families back into the city centre. The project promotes walkability, preserves local identity in four carefully restored old houses, and enhances

[12]Boussaa, D. *Old Doha in Qatar, What Future in a Global City?* The European Conference on the Social Sciences, 2013

[13]For the first time the theme appeared in: Hobsbawm, E. and Ranger, T. (eds.), *Invention of Tradition*, 1983

Figure 8. The mega-project of Msheireb , to the left the Souk wakif and the Al Koot fort
Figure 9. Arct 410 Studio V Department of Architecture and Urban Planning, Qatar University, fall 2014. Tentative of re-sewing the fabric infilling the large wide spaces

the interaction between the different cultures present in Qatar. It is designed with a dry, elegant architectural language, inspired by the traditional local design[14]. The problem, generated by the roadway plan of the seventies, is that the quarter is now an island and its insularity is accentuated by the localization of high density taller buildings along its edges. If the model becomes economically successful then it will be transferred to the adjacent areas, drastically reducing the connectivity of the city.

The areas of Al Asmakh, Al Najada and Baraka are a mosaic made up of bits and pieces of fabric of courtyard houses (consisting of ground floor plus first floor);, apartment houses of the seventies, made of reinforced concrete (consisting of three floors- ground

[14]*Dohaland. Musheireb Summary Fact Sheet*, 2011

plus two other floors) today, totally obsolete and office buildings with high density- between 6 and 12 floors, inserted along the main avenues, alternating with empty spaces.

The alternative to the current policy is the integration of the "islands" with a radical pedestrianization , favoured by underground vehicular routes and infilling of the leftover spaces with mixed-use building types, re-sewing up the wounds in the urban fabric through a patient search for any remaining traces.

In conclusion

Doha, Dubai and Abu Dhabi are cities of the crisis, not only as remnants of a Western crisis of long duration, but because, in their growth, they intentionally exaggerate the components of crisis. If we look beyond the appearance of the fables and images of their superlative architecture, they appear to us as still immature cities, segmented and segregated in homogeneous serial suburbs, crossed by fast highways.

The real issue is the inequality they produce as the human body produces cancer cells. The solution does not consist in setting downstream a single problem with a mega-project, but rather in understanding the essence of the problems in its context.

One last thought: it is not always true that globalization produces homogenization. In the competition that global cities engage in, a form of differentiation may be in contact with the local economies[15]. Designing in the spirit of the place is not in contradiction with the reality of the global city. This simple principle should prompt a reversal in the operating method of scholars and architects, by facing, not veiling the urban problems of the city with unprecedented mega-projects, or solving the technological problems with more and more updated technology application.

Urban design and technological processes today are conceived as products - invented elsewhere, patented and sold at a high price - often on top of (and opposed) to the place, unlike the works that are integrated into the local context and which draw inspiration from it.

References

Boussaa, D. (2013), *Old Doha in Qatar, What Future in a Global City?* (The European Conference on the Social Sciences).
Cataldi, G. (ed.). (1984) *Saverio Muratori architetto (1919-1973). Il pensiero e l'opera*, Studi e documenti di Architettura, 12, (Firenze, A-Linea).
Eben Saleh, M.A. (1998), "The Integration of Tradition and Modernity, a Search for an Urban and Architectural Identity", in *Elsevier*, 22, 4, pp. 571-589.
Elsheshtawy, Y., (2008), "Transitory Cities: Mapping Dubai's Forgotten Urban Spaces", in *International Journal of Urban and Regional Research*, vol. 32, 4 pp. 968-988.
Hobsbawm, E. and Ranger, T. (eds.), (1983) *Invention of Tradition*, (Cambridge University Press, London).
Khalil, R.F. and Shaaban, K. (2012), "Rebuilding Old Town. The Case Study of Doha, Qatar". In *Proceedings real Corp 2012 Tagungsband*
Kovessy, P. (2015), "Qatar answers call for better worker housing with new "Labour City"" in *Doha News*, Nov. 5.
Muratori, S. , (1963), *Architettura e civilta in crisi,* (Centro Studi di Storia Urbanistica, Roma).
Petruccioli A. (2007), *After Amnesia. Learning from the Mediterranean Islamic Urban Fabric*, (ICAR, Bari).
Salama, A. and Wiedmann, F. (2014), *Demystifying Doha: On Architecture and Urbanism in an Emerging City*, (Ashgate, London).
Sassen, S. (2009), "Cities in Today's Global Age",in *SAIS Review*, vol.XXIX,1.
Timmer, V., and Seymoar, N.-K., (2006), *The Livable City.* (International Centre for Sustainable Cities, Vancouver).
Walker, L. (2016), "Many Qataris Further falling into debt to two social pressure" in *Doha News*, March 11.

[15]Sassen, S. "Cities in Today's Global Age",in *SAIS Review*, vol.XXIX,1, 2009

Spanish Network of Urban Morphology

Spanish Network of Urban Morphology, establishment of the Isuf-Hispanic (Isuf-H) regional group

Vicente Colomer Sendra
President of ISUF-H

Introduction and justification

The research on urban form being developed by ISUF, the online magazine UM and the origin and contents of the papers of Annual Meetings, stated that the investigation of the urban form, could be extendeded in some specific aspects such as those linked to the historical urban heritage in the context of the Countries of Spanish Language (CSL). Also if we pay attention to the specific aspects of the big changes that have occurred in this territorial and urban settings

As a way to complete the ISUF network, the ISUF-HISPANO (ISUF-H) main objective is the creation of a network in the Countries of spanish lenguaje (CSL).

Special attention for ISUF-H is the architecture and urbanism of the Spanish-speaking world, both in its economic aspects and incorporating the transformations of modernity and contemporaneity, as well as problems arising from the current environmental crisis, and it's emphasis on the need for new horizons for urban planning and architecture of the future.

Creating ISUF-H will be based on the 8 points signed by the members of the core group teachers: José María Ureña, Borja Ruiz de Apilánez, Eloy Solis Vicente Mas, Javier Pérez Igualada, Ignacio Bosch, Luis de Armiño and Vicente Colomer, on the report of the 1st meeting of Valencia of October 2, 2014 and are as follows:

1. *To affirm our will to found the ISUF-Hispano (ISUF-H) as Regional Group INTERNATIONAL SEMINAR ON URBAN FORM (ISUF) and achieving fully operational in September 2015, coinciding with the 22nd Conference in Rome.*
2. *Contact ISUF Council to communicate our initiative and seek their help and advice.*
3. *Submit the advice of ISUF our proposal to organize a first conference ISUF-H and Valencia's bid to host the 24th Conference ISUF 2017.*
4. *Contact the boards of other regional groups such as Portugal and Italy PNUF, ISUF ITALY, to take note of the ways that have been organized.*
5. *Generate a list of candidates founding members from different institutions and countries, to represent the Hispanic community of researchers from urban form.*
6. *Explore possibilities for funding and other requirements for the operation of ISUF-H.*
7. *Explore options for developing a webpage of ISUF-H*
8. *Explore possibilities for editing a newsletter or magazine.*

Speaking of Rome ISUF 2015, whose theme is "City as organism: new visions for urban life", we propose to ISUF Valencia 2017, the theme "urban form and social use of space", which is intended as a wake-up call on the future architecture and urbanism, which is only justified to the extent that will serve to improve the living conditions of life of mankind in society.

Research and practice of proposals for urban form Isuf-H

1. Definition of a space marked by the same language
   1.1 - Territorial and urban aspects common to the countries of Spanish Language CSL.
   1.2 - The historical heritage, pre and post Columbian in CSL.
   1.3 - Heritage common and specific aspects in the cities of the CSL.
2. Promote the exchange of interdisciplinary experiences: investigative, educational, urban and architectural practice Europe-America
   2.1- Strengthening the pooling of disciplines involved in the study and practice of urban form in the CSL.
   2.2- European City - American city: analysis, forms and techniques of intervention.
   2.3- Management and public-private concert in configuration space in the cities of Europe and America. Comparison of urban agents and operators. .
   2.4- Euro-American Culture in the roots of the urban form of the cities of the CSL.
   2.5- ISUF-H, will have among its activities, participation in the implementation of operational Workshops of Architecture and Planning, coordinating universities and architecture schools in Europe and North America
3. Research on the shape of the recent urban expansion in Countries of Spanish-language
   3.1- Analysis of the profound recent changes in the cities of the CSL.
   3.2- The problem of Historic Centers: Characterization heritage. Research and technical review of urban revitalization.
   3.3- Research and intervention techniques in the informal city.
   3.4- Paradigm Cities in the CSL and its Urban Regeneration processes
4. Integration of environmental studies in the analysis of urban form
   4.1- Urban form and climate in the different geographical areas of the PLE.
   4.2- Energy simulation tools for calculating energy expenditure.
   4.3- Impact of urban form in CO2 emissions into the atmosphere. Calculation tools.
   4.4- Urban form in CSL and impact of urbanization on climate change.

Polish Network of Urban Morphology

Marketplaces as particularly active urban public spaces

Monika Gołąb-Korzeniowska, Anna Agata Kantarek
Faculty of Architecture, Cracow University of Technology
Keywords: Krakow, urban growth, living structure, marketplace

Abstract

Marketplaces are deeply inscribed in the culture of European Cities. Their activity is related largely to the economic situation of the community.

In the period of political changes in Poland in the 90th of the XXth century the street trading was omnipresent in Polish cities. The existing marketplaces became more active and a number of city squares surface were taken by commercial functions, causing changes in the functioning of their surroundings. Spontaneity of use in the squares not prepared for the adopted function, lack of infrastructural facilities, and provisional development resulted in the reconstruction of these places. Economic changes taking place in the last 20 years in Poland weakened the intensity of this kind of trade, but a number of these sites in the structure of urban cemented its usage acting as important public spaces for residents.

The paper is the result of research on the local markets of Krakow in important period after political changes – 1990-1997 done by M. Gołąb-Korzeniowska with the reflexion on used methods and current situation.

This paper presents some aspects of the dissertation by Monika Gołąb-Korzeniowska on the marketplaces of Krakow (Gołąb-Korzeniowska M. (1997) The Role and Importance of Market Places in Town's Spatial Structure - Cracow Case Study, doctoral dissertation). It is situated in the formula of discussion over the City as a living organism. It has the space of the city as a subject with its relations to the life of its community.

Commercial function is one of the fundamental for shaping urban form. The effects of the research mentioned above are monitored on an ongoing basis in changing conditions of the development of commercial function in the city. They indicate the timeliness of existing formula of the marketplace and its spatial form but at a reduced intensity of use of retail space.

Methodology of the research shows an example of this kind of work which is carried out in the field of architecture and urban planning, which relate to the form of the city or its elements in their historical shape and development with the principles of topical, spatial and temporal significance. In addition, work is based on enumerative induction, analyzing all examples of chosen category.

Contemporary studies on urban form in Poland, as explained in the previous paper are of varied nature. Within studies related to architecture, urban design and urban planning and prescriptively focused we are just before formulating modern research needs and working out appropriate methodological tools. The basis for their definition is a summary of the achievements of research on urban form and an extensive analysis of contemporary conditions.

Marketplaces are a type of space which is a part of the European city culture. Their activity is to a great extent related to the economic situation of a given community.

There was a time in Poland – during the political regime transformation in the 90s of the 20th century – when street trading was ubiquitous, the previously existing marketplaces sprang to life anew and numerous urban squares adopted commercial functions bringing about changes in the functioning of their environs. The spontaneously originating new use of the squares which had not been prepared for performing the adopted

function, absence of the necessary infrastructure and the makeshift character of development all resulted in a transformation of these places. Economic changes taking place in Poland in the last 20 years have restricted the intensity of trading in marketplaces, yet the new function of a number of city squares has become established in the structure of the city, becoming important public spaces for the inhabitants.

The presentation discusses the results of research into Krakow's marketplaces in the period of 1990 – 1997 in the aspect of their influence on the city's functional and spatial structure with preliminary issues for analysis of the current situation (2015).

Introduction

The research into the contemporarily existing marketplaces in Krakow has been undertaken in order to find out what is the influence they have on their environs in the aspect of their spatial transformation. The research consisted of the following stages:

- analysis of the relations between the marketplaces and their surroundings – influence on the urban form,
- determination of the form transformation trends, of the manner in which the places are arranged and their significance for residents and, finally, of their functional and spatial consequences for formally diverse urban structures in the process of their development.

The research covered the area of Krakow in its administrative boundaries. The time frame of the research encompasses the period from the commencement of the political regime transformation in 1989 until the present moment – against the background of the historical evolution of the marketplaces' function, form and tradition.

The research was carried out in the following aspects:

- the influence of the marketplace form on the spatial arrangement of the neighbouring development,

- how the use of the place affects functional changes in its surroundings,
- its social and cultural significance as a place of social contacts.

The analyses carried out in the scale of the city allowed differentiation of certain functional types and forms of the marketplace and their metamorphosis in the considered period of time. The generalised conclusions are the starting point for detailed characteristics.

The problems of historically transforming form of the marketplace (place) of a commercial function and the manner of its use in four periods pertain to:

A. marketplaces originating from the historical tradition of markets – multifunctional squares and the ones destined for only one specific trade (e.g. fish markets or salt markets), growing too large for their locations and transferred outside the town, only to be subsequently reabsorbed by the expanding urban structures, characterised by the shape of a square with its sides built-up with houses in traditional urban fabric clusters (until the II World War);

B. marketplaces of the post-war period, existing in the conditions created by the new political regime, of provisional forms of space arrangement and trading opportunities limited to small garden produce and crafts, yet cultivating the tradition of women vendors and strengthening the specific character of the place.
They keep their traditional locations, but also gain new ones – in the new modernist form of the city (e.g. Bulwarowa or Bieńczyce), they exist until the late 80s of the previous century.

C. Marketplaces of the economic transformation period – a unique economic and social situation, where the throng of users (selling and buying) crowded in the space of markets (places destined for this function) exceeded the capacity of these places and overflew into their surroundings. Simultaneously, they expanded considerably in the areas of residential development characterised by scattered arrangement of buildings (housing estate type) creating places of social significance. However, make shift and unsightly components of the arrangement remained in disharmony and destabilised the estate layout. The need to rebuild the area of all the marketplaces led to a new trend in their arrangement: similar development type and appearance adjusted to the character of the marketplace location, with a marked-out area of variable character of arrangement with temporary location of selling tables. Places for trading were also introduced into post-industrial or storage areas in the outskirts of the city (years 1989- 2000).

D. Marketplaces of the last 15 years, the period of great and huge development of commercial venues – supermarkets and shopping malls – attracting many customers previously shopping at marketplaces, offering an attractive area and space for meetings, yet with a completely different character of the vendor – buyer relationship. It did not, however, lead to the disappearance of marketplaces, but merely changed the character of their trade. This last period is not included in basic research.

The marketplace tradition in Krakow

In the Middle Ages, three towns were located on the area occupied by modern day Krakow: Krakow – with two squares where markets were organised: Rynek and Mały Rynek, Kazimierz with Wolnica square and the ancillary marketplace: Psi Rynek, and Kleparz with its Rynek. Some of the suburbs growing around Krakow also had places for street trading. The city's spatial development absorbed the suburbs together with their existing marketplaces, created new locations for this function and brought on relocation of bothersome markets to new places. According to the municipal register, there were 11 marketplaces in the area of Krakow in 1909, 22 – in 1938 and 21[1] – in 1975. According to Atlas Miasta Krakowa (the Atlas of the City of Krakow) of 1988, there were 22 of them in the city. The period of the greatest expansion of street/square trading in 1995 is reflected in the fact that there were 29 functioning areas of this type at that time. The

[1]The register of marketplaces from 1975 lists 20 squares and one indoor market hall.

City Council's data of 2015 list 16 marketplaces. It must be noted that the above numbers refer solely to marketplaces which are municipal property. Apart from them, there have always been marketplaces run by other owners as well as "informal" ones emerging and operating spontaneously.

The form of the marketplace

The markets are placed in different urban structures. The shape of the square and its size determine the arrangement of the trading function in two spatially different types of squares – urban enclosures surrounded by compact urban fabric on the one hand, and areas marked out in complexes of more scattered development on the other. In the first case, they reflect the consequences for urban square enclosures and their environs brought about by the trading function located within them, in the other – the way they affect the use of the place, the spatial transformations of the market surroundings and the ways in which the form of the marketplace develops.

The relation between the area of the marketplaces and the development arrangement in their surroundings gives grounds for defining different spatial forms of the market. They also differ in the size of the area in which the trading activities take place. The size of

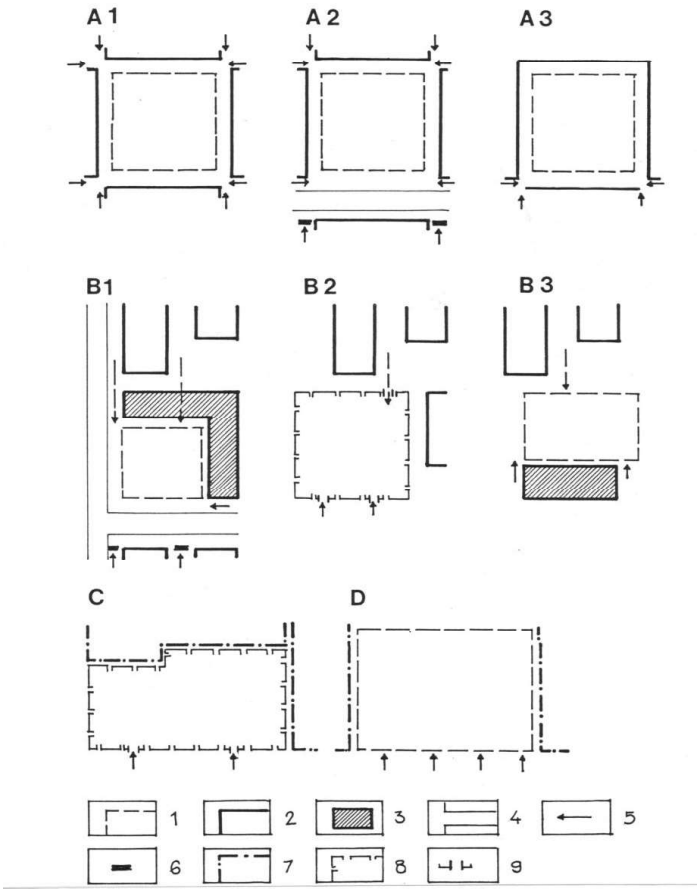


Figure 1. Diagrams of spatial arrangements of marketplaces functioning in the area of Krakow.
1 – boundaries of the commercial area, 2 – walls of the buildings, 3 – pavilions providing services, 4 – streets with high volume of traffic, 5 – main routes leading to the market place, 6 – barriers for pedestrian traffic, 7 – boundaries of areas of different use, 8 – fencing, 9 – entrance gates. Location of the market in: A – compact urban fabric making up urban blocks, B – housing estate structure of scattered development, C – mixed structure, D – industrial and storage areas.
Source: Gołąb-Korzeniowska M. (1997) The Role and Importance of Market Places in Town's Spatial Structure – Cracow Case Study, doctoral dissertation p. 71

Krakow's market ranges from approx. 450 m^2 to as large as 54,000 m^2, although the vast majority fall within the range between 2,000 to 4,000 m^2.

Marketplaces are situated in:

A. compact urban fabric making up urban blocks, typical of the city development up to the II World War, with the prevailing housing and services function;

B. the structure of housing estates of scattered development layout;

C. mixed structure made up of buildings varying both functionally and formally, located randomly, or at the junction of different spatial arrangements;

D. disorderly arrangements of storage and industrial development.

The spatial forms of marketplaces have been presented in Figure 1.

The location of the markets affects their spatial form and functional capabilities. The analysis of the size, shape and the arrangement mode indicates the possibility of classifying them into the following groups:

- Marketplaces with boundaries clearly defined by the surrounding buildings functioning within the urban enclosure of the market square are represented by three types (A1, A2, A3). Type A1 – equally open on all sides, which is the result of its being connected with the surroundings by streets similar in size and significance, type A2, in which one of the streets leading to it is considerably larger, giving the impression that the square is open towards it, and type A3 – a square built-up on three sides. The squares from this group range in size from 1,600 m^2 to 4,600 m^2, the sizes depending on the existing urban blocks.
- Marketplaces in housing estates of scattered layout of development are usually located on the outside of the estate complex. The types of markets situated here (B1, B2, B3) differ one from another in the degree to which they are marked out in the surrounding area. Type B1 is a place related to the already existing (usually commercial) facilities, or the ones created already after the market had commenced its functioning, providing services to the estate; they create boundaries for its form at least on two sides and provide a visual closure, B2 are areas marked out by fencing or the wall of pavilions aligned in a row. This type most often transforms into a more permanent development composed of small pavilions used by vendors previously trading from tables in the open, changing and stabilising the marketplace form in the surrounding space. The last type B3 are marketplaces functioning next to a larger commercial facility (usually built together with the housing estate for the purpose of providing services to its residents) creating one of its walls. The area destined for trading in this group has the shape of a square and its size varies from approx. 450 m^2 to over 7,000 m^2.
- The last group (labelled C and D) are the places of the largest area (reaching even 50,000 m^2), which are not clearly marked out with any development. Their boundaries are usually defined by openwork fencing or, as in the case of B2, elements of built-up development of the square. The place marked as D2 is a special type of commercial area which has no boundaries defined in any way, they appear and disappear periodically.

Whether a space of a marketplace is perceived as characterised by clarity of form depends to a great extent on the elements of development present in this area. The facilities most frequently encountered in the market area used to be stalls and temporarily set up tables. Krakow has no tradition of typical market halls. The only one, opened in 1938, now functions as a supermarket. The changeability of the market area arrangement resulted from the temporary character of the trade that took place there; this in turn was related to the changing interest in the merchandise, the frequency of the sale itself and – in many cases – also from the seasonal character of the produce on sale. The profession of a woman vendor offering her merchandise on a daily basis resulted in the marketplace development adopting more and more solid forms, which were the property of individual owners (yet still leaving a part of the area free for more temporary vendors). In the 90s of the 20th century, during the political regime transformation, the trading in marketplaces considerably exceeded the spatial capacity of these areas, their arrangement was totally chaotic, they were messy, with very poor sanitary conditions and the facilities built at that time, completely devoid of any aesthetic value, only reinforced the negative reception of these places. The necessity of introducing some order

into marketplaces, particularly important in the city central areas, led to the present form of arrangement. It consists in individually used small facilities located and built according to a plan of the whole area. This model of arranging development units dominates on the majority of marketplaces, regardless of the urban structure they are located in. However, the perceived spatial form is created by the relations between the marketplace and its surroundings. An image created within clearly legible boundaries of a square defined by lines of development is different from the one characterised by an imprecise form of development layouts, where the marketplace is a form in itself, unrelated to its surroundings. The spatial form of a marketplace results from its functional character.

Functional types of marketplaces

The trading that takes place in markets is varied in its merchandise type, permanent or temporary vendors (registered or unregistered) and the type of sales – retail or wholesale. The above factors are of great importance from the point of view of the demand for space, the needs related to the place furnishings and the targeted customers.

The marketplaces functioning in Krakow may be classified into the following functional types:

a) traditional marketplaces – the merchandise is sold here in retail quantities, mostly fruit and vegetables, and also to a lesser extent – other products and crafts,

b) marketplaces of the "flea market" type – offering a very extensive array of various non-grocery products (mostly industrially manufactured, but also crafts),

c) wholesale or semi-wholesale marketplaces –selling primarily fruit and vegetables directly by the farmers, and to a lesser extent also other groceries and crafts.

Figure 2 presents the distribution of various functional types of marketplaces at the times of the greatest street trading expansion in 1996.

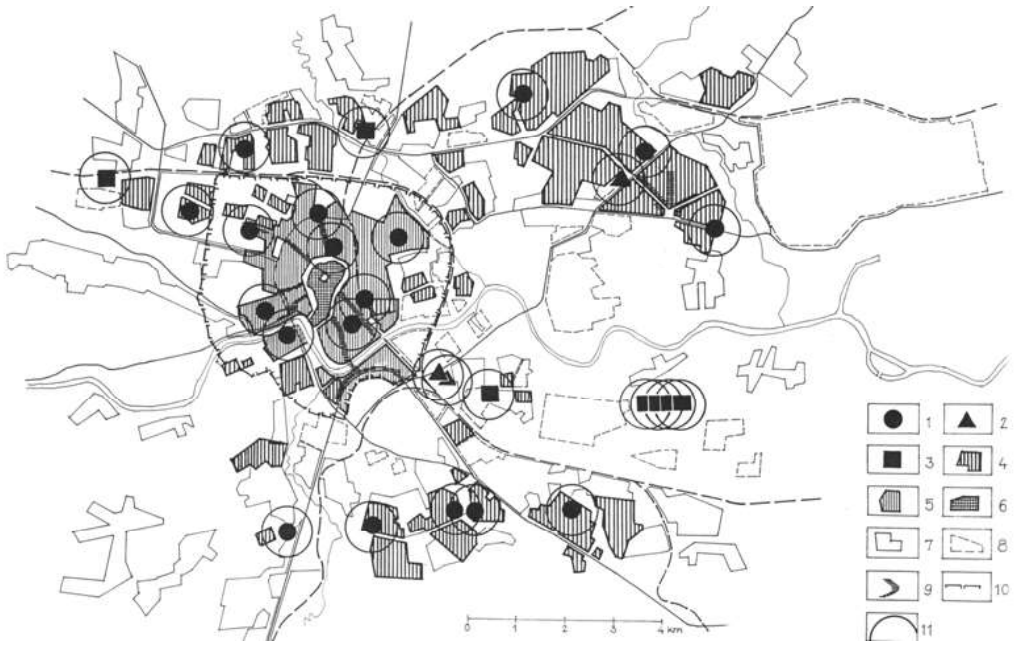


Figure 2. Distribution of marketplaces as related to the residential development complexes and to the city centre and the main street arteries (1996)
1 – traditional marketplaces, 2 – places of the "flea market" type, 3 – wholesale markets, 4 – housing estate complexes, 5 – areas of compact urban development, 6 – the area of the Old Town, 7 – boundaries of the remaining development complexes, boundaries of larger industrial complexes, 9 – main lines of services facilities, 10 – the boundary of the functional centre, 11 – the 500 m radius zone enabling access to a marketplace within 7 – 10 min.
Source: Gołąb-Korzeniowska M. (1997) The Role and Importance of Market Places in Town's Spatial Structure – Cracow Case Study, doctoral dissertation p. 66

Places for urban life created for commerce and the ones adopting the function of commerce

A considerable part of squares were created for the purpose of enabling the sale of merchandise. This function was dominant or exchangeable with other types of activities, such as e.g. religious ceremonies or secular celebrations. This was particularly true for marketplaces and squares of the located city layouts which were in the process of formation and new places for commercial activities were being decided, such as e.g. the horse market in Na Groblach square or the squares in Nowa Huta emerging in the 20th century, or the ones created for farmers selling their produce in wholesale quantities (the Imbramowski market). The majority of historically formed squares are situated in the central areas of Krakow in historic urban complexes. The ones where the commercial function continues to dominate are very popular places, eagerly visited both by residents and tourists. A number of squares have lost or considerably reduced the commercial functions, yet they have retained the permanently

created from of a market square, so important in the system of public spaces in the city, these are e.g. Mały Rynek, Wolnica Square, Podgórski Square or Zgoda Square. At the same time trading entered areas left vacant after other types of use had been removed, and so it took over the empty lots created by demolition of buildings in the 19th century in the thus created Szczepański or Słowiański squares. In the more contemporary period of the city development, at the time when marketplaces were in the greatest demand, it found its way into car park areas (markets in Białoruska and Jerzmanowskiego streets), storage places (Rybitwy, Balicka street) and other undeveloped areas. The vast majority of marketplaces created in the 90s have stayed in their locations, and in housing estates they have become meeting places for the neighbourhood residents. Interviews carried out with customers of such marketplaces indicate that they hold them in high esteem due to the great variety and good quality of the merchandise on sale – fresh fruit and vegetables, but also because they offer them an opportunity to talk to friends and vendors. It should be mentioned that the majority of customers are residents of the housing estates, often living alone, for whom the opportunity of social interaction is an important attraction of these places, and it results from the character of the trading itself. When they talk about the marketplace, they use expressions as: my market or in our market.

Conclusions

Marketplaces in the space of contemporary city (Krakow) play an important role for urban public spaces. Their appeal is based mostly on the specific character of trading (the relations between the vendor and the customer), variety and often uniqueness of the merchandise, but also on the special ambience of these places. Historical continuation of tradition of the places completes the comprehensive significance of marketplaces in urban fabric, combining old functions with the form which has been crystallised to cater for their needs and keeping the places vibrant with life.

Spatial characteristics of different marketplaces result from their location in diverse development structures. Markets situated outside the areas of compact urban development affect spatial transformations not only because they create a given form, but also because they bring on the emergence of pedestrian routes leading to them, car parks serving their customers and also other facilities providing services.

The recent years have seen the emergence of numerous chain stores, super- and hypermarkets of an enormously varied range of merchandise and relatively low prices, which have attracted a number of customers away from the marketplaces. It has led to the diminishing of significance in the case of many marketplaces, but not to their elimination from urban spaces (apart from certain temporary ones, which have been used as locations for construction projects). The drop in the number of marketplaces on the Krakow City Council list results to a great extent from the fact that some of them have been taken over from the city by private owners. Nevertheless, they continue to operate in their former function (e.g. Tomex – one of the largest spaces of this type). Historic

places – due to their activity and functional continuity as well as picturesque character – are attractive spaces in the area of the Old Town. Whereas in the areas with no clearly formed enclosures, the marketplaces create their own, often impermanent form of arrangement, which frequently becomes more stable with time and constitutes the starting point for transforming its surroundings and giving them a new significance for the neighbourhood residents.

References

Bieniarzówna J, (1993), 'Krakowskie targi w dawnych wiekach' in: Katedra Etnologii *Krakow- przestrzenie kulturowe*, Wydawnictwo Platan, Krakow.

Bieniarzówna J, Małecki J.M., (1979), *Dzieje Krakowa* Vol. III, (Wydawnictwo Literackie, Krakow).

Bieniarzówna J, Małecki J.M., (1984), *Dzieje Krakowa* Vol. II, (Wydawnictwo Literackie, Krakow).

Blazy R., (2010), 'Tradition and Modern Public Space, the Problem of the Meeting in a Space', in Technical Transactions 2-A/2010 Cracow University of Technology Press, 19- 24.

Blazy R., (2013), 'Commercialization of the Public Spaces', in Architectura v Perspectivie, Architektura A Urbanismus 2. Poloviny 20. Stoleti, M. Perinkova ed., Ostrava : Stavebni fakulta, Vyskoka skola banska - Technicka univerzita Ostrava, 27- 31.

Gołąb- Korzeniowska M., (1997), 'The Role and Importance of Market Places in Town's Spatial Structure – Cracow Case Study' - unpublished PhD thesis, Cracow University of Technology, PL. http://suw.biblos.pk.edu.pl/resources/i3/i9/i1/i5/r3915/GolabKorzeniowskaM_RolaZnaczenie.pdf accessed 24 May 2015.

Gołąb- Korzeniowska M., (1993), 'Przemiany kształtu przestrzeni miejskiej związane z rozwojem drobnego handlu - na przykładzie Krakowa', in City and Regional Planning Institute post-conference papers, Krakow.

Mydel R., (1977), 'Place targowe współczesnego Krakowa', in Zeszyty Naukowe UJ, prace Geograficzne nr 44.

Sulimski J., (1976), *Krakow w procesie przemian*, (Wydawnictwo Literackie, Krakow).

Wyrozumski J., (1992), *Dzieje Krakowa* Vol.I, (Wydawnictwo Literackie, Krakow).

Wykaz targowisk miejskich (2015) https://www.bip.krakow.pl/?dok_id=18263 24.05.2015

Portuguese-language Network of Urban Morphology

Urban Morphology in Portugal: Searching for an identity

Teresa Marat-Mendes,
Instituto Universitário de Lisboa, ISCTE-IUL, DINÂMIA'CET-IUL
Keywords: Identity, ISUF, Portugal, PNUM, Urban Morphology

Abstract

The foundation, the development and the goals of the Portuguese-language Network on Urban Morphology, PNUM, a Local Network of ISUF, are here presented. Moreover, analyses of the several drivers that have guaranteed the consolidation of a Portuguese Local Network of ISUF are here introduced. Complementary, based on research conducted by Teresa Marat-Mendes and Maria Amélia Cabrita about the foundations of Urban Morphology in Portugal; this paper argues that the heterogenic cultural background that seems to characterize PNUM is not entirely novel; as it seems to reproduce a Portuguese characteristic or Identity that is strongly built over the ability to build connections and integrations between Portuguese individualities with international bodies, institutes and universities, over time. Moreover, such connections and integrations seem to have contributed to deliver the most innovative knowledge regarding the study of urban form in Portugal. Therefore, it is imperative to PNUM to assure within ISUF the continuity of such connections and integrations and establish new connections between ISUF members and local networks. Furthermore, it is hope that such interest can contaminate ISUF itself, and promote the opening of new bridges among ISUF members and local networks, but also to reopen former ones, so that a truthfully collective project with interest to the study of urban form can grow and contribute to fully acknowledge the Identity of ISUF itself.

The formation of a Portuguese Local Network of ISUF, the Portuguese-language Network of Urban Morphology (PNUM) was proposed on August 2010, at the Seventeenth Conference of ISUF. It was at the ISUF Council meeting at that conference that a proposal for the PNUM Constitution was presented by Teresa Marat-Mendes and Vítor Oliveira.

The constitution proposal included: i) the designation of the Portuguese ISUF local network; ii) the main objectives of the group; and issues related to iii) the membership, and the group organization. A list of fourteen founding members integrated such proposal. These members were mostly academic and research staff, which belonged to different Portuguese university institutions with a common interest, which was to establish in Portugal a research network within the study of urban morphology. Three preliminary meetings occurred between September 2009 and May 2010, in Portugal, among some of these members wherein the preparation of the group and the Constitution of PNUM itself were delineated.

The fourteen founding members of PNUM, registered in alphabetical order, were: Elisabete Silva (Cambridge University); Jorge Correia (Universidade do Minho), Jorge Gil (Universidade de Lisboa), José Duarte (Universidade de Lisboa), Mafalda Sampayo, (Instituto Universitário de Lisboa ISCTE-IUL), Manuel Teixeira (Universidade de Lisboa), Mário Fernandes, (Universidade do Porto), Mário Kruger (Universidade de Coimbra), Miguel Bandeira (Universidade do Minho), Paulo Pinho (Universidade do Porto), Teresa Heitor (Universidade de Lisboa), Teresa Marat-Mendes (Instituto Universitário de Lisboa ISCTE-IUL), Vitor Oliveira (Universidade do Porto) and Walter Rossa (Universidade de Coimbra).

As an appendix to the PNUM Constitution presented by Teresa Marat-Mendes and Vítor Oliveira to the ISUF Council, on the 19th of August of 2010, it was included the paper 'The study of urban form in Portugal' by Vítor Oliveira, Magda Barbosa and Paulo Pinho (2011). This paper introduced one of the first attempts to review what research on urban morphology was being conducted in Portugal.

The main goals for the foundation of PNUM were to: 1) promote in Portugal the study of urban form; 2) to establish and develop in Portugal, a research network in the field of urban morphology, through the organization of meetings and conferences, the publication of a newsletter, and the development of joint applications for national funding; and 3) to establish a privileged relationship with ISUF, through the collaboration on ISUF initiatives of debate and promotion of urban morphology, and the development of joint applications for European funding.

It is most rewarding that this network has attracted so much interest from colleagues in Brazil. Such interest has been testified through the number od Brazilian members attending the various PNUM Conferences but also the involvement of Brazilian colleagues in PNUM activities. It would be in 2014, at the PNUM Scientific Council, four years after its constitution, that PNUM would officially integrate in its designation 'Portuguese-language Network of Urban Morphology' (*Rede Lusófona de Morfologia Urbana*) the reinforcement of the Portuguese-Brazilian alliance. Moreover, PNUM Scientific Council, previously constituted by Vítor Oliveira (2010-2016), Teresa Marat-Mendes (2010-2016), Paulo Pinho (2010-2013) Jorge Correia (2010-2015), Mário Fernandes (2010-2013) and Miguel Bandeira (2014 -2016) would now integrate two Brazilian colleagues, Stael de Alvarenga Pereira da Costa and Frederico de Holanda.

PNUM activities

Over the past five years of the PNUM existence a number of activities and initiatives have been conducted by PNUM, greatly supported by the enthusiasm and the energy of its members, as recorded in the various reports prepared by PNUM and published at Urban Morphology (Oliveira, 2011, 2012, 2013, 2014; Marat-Mendes, 2015).

At present PNUM integrates 865 members, belonging however to fifteen different countries. Namely: Angola, Australia, Belgium, Brazil, Cape Verde, Denmark, France, Germany, Holland, Italy, Mozambique, Portugal, Spain, Switzerland and Vietnam. Much of PNUM's rapid growth is attributable to its annual conferences, which have served as important forums for debate on urban morphology.

Five international conferences have been already promoted by PNUM. The first PNUM Conference '*Morfologia Urbana em Portugal: Abordagens e Perspectivas*' was hosted by the Departmento de Geografia (Faculdade de Letras, Universidade do Porto) in June 2011. The second PNUM Conference '*Morfologia Urbana nos Países Lusófonos*' was chaired by Teresa Marat-Mendes and hosted at the Instituto Universitário de Lisboa ISCTE-IUL between the 5th and the 6th of June 2012. The third PNUM conference '*Forma Urbana nos Territórios de Influência Portuguesa: Análise, Desenho, Quantificação*' was chaired by Nuno Norte Pinto and hosted at the Universidade de Coimbra between the 27th and the 28th of June 2013. In 2014, Portugal hosted the 21st International Seminar on Urban Form, 'Our Common Future in Urban Morphology', which was chaired by Vítor Oliveira at the *Faculdade de Engenharia* from the *Universidade do Porto*. The fourth PNUM conference '*Configuração Urbana e os Desafios da Urbanidade*', was chaired by Frederico de Holanda and took place in Brasília, Brazil, between the 25th and the 26th of June 2015. This fourth PNUM conference constituted the first edition of PNUM conferences outside Portugal, thus reinforcing the Portugal-Brazilian alliance. A fifth PNUM Conference entitled '*Os Espaços da Morfologia Urbana*' will be hosted in Guimarães between the 15th and 16th July 2016, and is chaired by Jorge Correia and Miguel Bandeira.

Apart from its annual conferences, PNUM has also promoted the development of yearly Workshops. The first one took place in Porto, at the Faculty of Engineering of the University of Porto, between 30th June and 4th July of 2015, under the theme 'Different approaches in the study of urban form'. This Workshop counted with 30 participants, including students, academics, researchers and practitioners from public and private sectors in the fields of architecture, engineering and archaeology, from Brazil, Portugal and Spain (Oliveira, 2015). A second workshop is being prepared for 2016.

Apart from the organization of conferences and workshops, PNUM has promoted its activities and the study of urban form in Portugal and Brazil through the use of a Newsletter (2011-2012), a Website (http://pnum.fe.up.pt/pt/), and the publication since 2013 of the *Revista de Morfologia Urbana* (RMU), with two issues per year. Edited by Vítor Oliveira the *Revista* constitutes a major channel for the discussion of ongoing research and viewpoints about urban morphology among PNUM members. In addition, the inclusion in *Revista* of Portuguese translations of seminal papers originally published in English in *Urban Morphology* is a notable feature (Marat-Mendes, 2015).

A major publication, that is already available, is the book entitled '*The study of Urban Form in Portugal*', edited by Vítor Oliveira, Teresa Marat-Mendes and Paulo Pinho (2015). This book includes a foreword by Jeremy Whitehand and eight chapters which introduce different disciplinary, methodological and conceptual approaches to the study of urban form, by fourteen Portuguese researchers, most of them PNUM founding members.

It is important to recall that PNUM embraces a number of members, which do not necessary share the same disciplinary background, methodological or even conceptual approaches, in what relates to the study of urban form. That is possible to be registered in the book '*The study of Urban Form in Portugal*' (Oliveira, Marat-Mendes, Pinho, 2015). Nevertheless, it is precisely this variety of points of view, thoughts and ways of perceiving urban form that definitely contributes to build the contemporary Identity or the character of PNUM group.

Thus, more than trying to identify or define a specific Portuguese-language School of thought of Urban Morphology, which so far has been concluded that it does not exists (Oliveira, Barbosa, Pinho, 2011; Marat-Mendes and Cabrita, 2012), PNUM has contributed to identify different approaches to the study of urban form in Portugal. Certainly, several other more Portuguese, Brazilian and Lusophone ways of approaches to the study of urban form do exist, and are becoming to be organized and systematized, and therefore deserve all our attention.

It is indeed in this variety of approaches that one can identify PNUM's contribution to the consolidation of a heterogeneity of the Portuguese cultural background as argued by Marat-Mendes and Cabrita (2012). To better explain this topic, this paper follows with a brief analysis into the results of a research conducted by Teresa Marat-Mendes and Maria Amélia Cabrita about the foundations of Urban Morphology in Portugal, and whose results

were first presented at the second PNUM Conference '*Morfologia Urbana nos Países Lusófonos*' and published in the proceedings book, available online, of that same conference (https://repositorio.iscte-iul.pt/handle/10071/3633) (Marat-Mendes and Cabrita, 2012).

Urban Morphology in Portugal: a review

The work conducted by Marat-Mendes and Cabrita (2012) aimed to identify in Portugal, how did urban morphology evolved in Portugal and was assimilated by a specific generation of architects, more precisely between 1960's and 1970's. Such generation seems to have shared an interest to the study of urban form that integrates a conceptual basis of urban morphology as also identified for the three schools of Urban Morphology, according to Moudon (1997).

In order to do so, during 2012, Marat-Mendes and Cabrita conducted eight interviews among Portuguese architects and other personalities whom have belonged to a Portuguese generation present in the Portuguese architecture and on the study of the Portuguese city during the 1960s' and 1970's. These were architects Bartolomeu Costa Cabral, Fernando Gonçalves, Francisco Silva Dias, José Charters Monteiro, Joaquim Braizinha, Luis Cunha, Nuno Portas and the sociologist Vítor Matias Ferreira.

Although the number of interviews is very few to witness an eventual Portuguese reality, Marat-Mendes and Cabrita (2012) could conclude that the results of these interviews revealed in Portugal, during the 1960's and 1970's the existence of an urban morphology basis mostly anchored on an intuitive nature. This basis seems however to match with the same principles defended by the three schools of Urban Morphology, as recognized by ISUF. Notably through sociological orientation basiss witnessed by sociologist Vicor Matias Ferreira and architect Luis Cunha, but also informed by urban design concerns and housing typologies, as witnessed by architects Francisco Silva Dias, Bartolomeu Costa Cabral, Nuno Portas and José Charters Monteiro.

The results of the interviews do also allow concluding that during the period of time under analysis, Urban Morphology in Portugal revealed a very obvious link between theory and practice. This was certainly grounded on the education of the Portuguese architects but also historians, geographers, sociologists, among others, whom was being conducted or complemented abroad in European Universities and Institutions, mostly in France, Italy, United Kingdom and Germany, among other countries. Such international training was only possible due to the financial support of the Portuguese Government in collaboration with institutions such as *Instituto Nacional da Habitação* (INH), the *Federação de Caixas de Previdência*, the *Laboratório Nacional de Engenharia Civil* (LNEC), the *Fundo de Fomento da Habitação*, or also through the research activities promoted by Portuguese architects with the financial support of the Fundação Calouste Gulbenkian (Marat-Mendes and Cabrita, 2012).

The link between theory and practice seems to have worked better during the years 60-70 than today. At that time, teaching staff and students from the Lisbon and Porto Schools of Architecture shared their works and programmatic issues with the Portuguese Municipalities or other governmental institutions such as the LNEC, the INH among others. Their reflections about the city and housing issues, in coordination with the study of urban form, allowed to explore new research findings of work that was being conducted in Cambridge, at the Centre for Land Use and Built Form Studies (LUBFS), in Italy, with the Italian School of Urban Morphology, but also through the sociological studies derived from the French School of Urban Morphology. However, over time, that morphological practice, which was identified by the interviewed architects seems to have vanished from Portuguese Architecture and Urbanism. However, it seems that such morphological practice has become assimilated in the memory of those who have used it, as Nuno Portas whom registered it throughout his written works (Portas, 2005a, 2005b). However, that seems to be less evident on the continuation of a pedagogical and methodological legacy in the generations of architects that have followed these later ones. This appears to be an important issue, as at present the Portuguese Schools of Architecture are being subject of research (Coelho, 2007; Moniz, 2011; Silva, 2011) in order to contribute and

clarify the history of the teaching of architecture in Portugal, but revealing yet a number of fragilities (Marat-Mendes and Cabrita, 2012).

As revealed from the interviewed architects and sociologist, the research practice in Portugal, with regard to the study of urban form, was very much influenced by the contacts established between Portuguese Architects with European Schools and Institutions. Moreover, the conceptual and methodological approaches appear to have been mostly intuitive, as they have never been established within the pedagogical compendiums of the Portuguese Schools, at least in a systematized manner. Nevertheless, such intuitive character seems to have influenced a generation of professionals, and built an heterogeneous background, in what regards the study of Urban Form, that so much reflects the Portuguese cultural character. Italy, France and the United Kingdom seems therefore to incorporate the main international influential backgrounds of Portuguese architects regarding Urban Morphology, mainly through the flows of information, publications and personalities between these countries and Portugal (Marat-Mendes and Cabrita, 2012).

Further research into the foundations of urban morphology in Portugal seems therefore important to be promoted, as a manner to clarify the identity of Portuguese Urban Morphology itself, one of the local networks of ISUF, PNUM.

Finally, it is imperative to PNUM to assure within ISUF the continuity of such connections and integrations and establish new connections between ISUF members and local networks. Furthermore, it is hope that such interest can contaminate ISUF itself, and promote the opening of new bridges among ISUF members and local networks, but also to reopen former ones, so that a truthfully collective project with interest to the study of urban form can grow and contribute to fully acknowledge the Identity of ISUF itself.

References

Marat-Mendes, T. (2015) 'Portuguese-language Network of Urban Morphology: President's Report', *Urban Morphology* 19 (2), 173.
Marat-Mendes, T (2013) 'Sustainability and the study of urban form', *Urban Morphology* 17 (2), 123-124.
Marat-Mendes, T., Cabrita, M. A. (2012) Morfologia Urbana em Portugal: percurso e visibilidade, in Sampayo, M., André., P., Marat-Mendes, T. (eds.) *Morfologia Urbana nos Países Lusófonos. Actas da Conferência Internacional PNUM 2012 Portuguese Newtork on Urban Morphology* (Instituto Universitário de Lisboa ISCTE-IUL, Lisboa), 1750-1781.
Moudon, A. V. (1997) 'Urban Morphology as an emerging interdisciplinary field', *Urban Morphology* 1, 3-10.
Oliveira, V. (2011) 'Portuguese Network of Urban Morphology', *Urban Morphology* 15 (2), 152.
Oliveira, V. (2012) 'Portuguese Network of Urban Morphology', *Urban Morphology* 16 (2), 165-166.
Oliveira, V. (2013) 'Portuguese Network of Urban Morphology', *Urban Morphology* 17 (2), 109-110.
Oliveira, V. (2014) 'Portuguese-Language Network of Urban Morphology: Report', *Urban Morphology* 18 (2), 155.
Oliveira, V. (2015) 'PNUM Workshop, Porto, 30 June-4 July 2015', *Urban Morphology* 19 (2), 172.
Oliveira, V., Marat-Mendes, T., Pinho, P. (2015) O *Estudo da Forma Urbana em Portugal* (Edições da Universidade do Porto, Porto).
Oliveira, V., Barbosa, M., Pinho, P. (2011) The study of urban form in Portugal, *Urban Morphology* 15 (1), 55-66.
Portas, N. (2005a) *Arquitectura(s): História e Critíca, Ensino e Profissão* (FAUP, Porto).
Portas, N. (2005b) *Os Tempos das Formas: A Cidade Feita e Refeita* (Universidade do Minho, Guimarães).
Talen, E. (2014) 'Urban design as an urban morphology', *Urban Morphology* 18 (1), 69-70.

Conclusions

Prof. Giuseppe Strappa
Conference Chair

Dear Isuf members and Participants to our meeting,
the Twenty-Second Isuf Conference is now concluded.
I hope it has been an exciting experience for all of us.
Let me propose a few brief reflections.
Each Isuf Conference has some specific features depending on the culture of the city where it takes place and through the institutions that hosts it.
I think our Conference has had two peculiar characters.
The first was a particular attention to the historic environment: to the historic territory, city, buildings.
I think this is a very significant field of study for the Urban Morphology.
A field different but complementary to historical studies. The historian is interested in the urban and architectural phenomenon in its singularity and specificity, in its value of documents, in its artistic quality. Many papers have confirmed, in this Conference, as the morphologist studies them, instead, in their transformations, as a process, linking the single phenomenon to the generality of similar phenomena. These are two aspects of the same problem. I think that the number and quality of the papers presented in this field of studies have given a special spirit to our Conference.
A second specific character depends, I believe, on the fact that the Conference was organized in a Faculty of Architecture.
Not by chance, many of the interventions have been interested in design.
We consider vital for architects to use Urban Morphology studies. Reading urban phenomena on a rational basis, the study of forming processes by scientific methods are not just design tools. They can correspond to a choice against the spectacular drift of much contemporary architecture. I believe they can even encourage an innovative way in making architecture: the project as an aesthetic synthesis of processes, not only a result of individual creativity. We all have seen how interesting are the designs of architects who are beginning topay attention to the issue.
I think it was also noteworthy the session dedicated to the formation of local networks. They will be, I believe, the future of Isuf. The more the different local networks will have their own character and will be rooted in their own culture, the more Isuf will be rich in fruitful contributions, capable of innovating our studies and our researches.
At the conclusion of this conference I would like to thank:
the Isuf Council, for having encouraged that the conference take place in Rome;
all the professors our PhD School and especially Irene Del Monaco, Marco Maretto, Dina Nencini, Paolo Carlotti, Fabrizio Toppetti;
the students of Draco Doctorate, for their enthusiastic help;
I would like in particular to thank the Conference secretary Anna Rita Amato who has played an invaluable role in the organization of our Seminar.
Thanks to all for your participation.
We will meet again next year at the Isuf Conference in Nanjing University.

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