

The law of Indies as a foundation of urban design in the Americas

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ABSTRACT: This study analyzes the establishment and functional structure of the population centres during the colonization process of the new provinces in the Americas. It is therefore a valuable attempt at recollecting and understanding information on the phenomena which marked the beginning of these settlements. When the Spanish Empire enacted a series of norms to guide the process of the founding of future populations in the discovered territories, thereby establishing the first territorial codes carried out that could be considered the first record of urban design and planning in the Americas. This paper analyses the criteria used by the Law of Indies in the settlements of frontier towns in Latin America using as a case study the city of Barcelona (Venezuela). This research relies on urban historiography of early cities in Venezuela and the morphology structure of the historic centre of Barcelona (Venezuela) from its foundation in the XVII century (circa 1671) to the turn of the XX century. Barcelona constitutes one of the clearest examples of the implementation of the regulations to direct the foundational process of the new settlements in the Americas. These regulations were based on a number of urban planning and sanitary principles that in turn, fostered order and organization over the colonization process in Hispanic America. On the other hand, the morphological principles derived from the Law of the Indies were already used in the layout of the Pre-Columbian American cities (Cuzco, Peru; Tenochtitlan, Mexico) as timeless 'Universal' principles in city design. These principles, conceived more than 400 years ago, are still prevalent as ordering concepts in modern urban planning. The relevance of this work lies in the fact that for the first time the city of Barcelona has gone under scholarly scrutiny of its physical structure and urban form.

Conference theme: Urban design studies

Keywords: urban design, planning history, urban morphology.

INTRODUCTION

The colonization of the new territories may not at first, have counted on a pre-established plan. Nonetheless, the dimensions of the discovery acquired prime interest to the Spanish Crown as an important source of wealth that required the design of a carefully crafted strategy that would bring coherence and continuity to the colonization process. As a result, the Spanish Empire enacted a series of norms to guide the settlement process of the newly found territories thereby establishing the first territorial codes to be carried out at that time. This could be considered the first record of urban design and planning in the Americas.

The model of the semi-lattice city plan used by the Spanish had great operational advantages which favoured the division of the lots of land among the inhabitants as well as allowing an easy pattern and division into streets and blocks, thanks to its geometric properties. Such ease, no doubt stimulated the rapid expansion of the urban Spanish network of towns in America and the division of land among the inhabitants

ensured a growing sense of identity to the new land.

The morphological background of the semi-lattice model in the Law of the Indies has its roots in the Greek colonies which were later adopted by the Romans in the conquered territories. On the other hand, the layout of some Pre-Columbian American cities (Tenochtitlan, Mexico; Cuzco, Peru) were already designed with a semi-lattice pattern as an additional feature that positively influenced the colonization process in the New World. The grid pattern is a constant component in the founding of Hispano-American cities applied to different topographic land and environments. This vision created a uniformed urban design pattern of cities in the Americas where a number of principles are considered 'Universal' in city urban planning worldwide.

The application of this model has shown a great structural flexibility and a multiplicity of morphological variations as opposed to the geometric rigidity that the reticular grid could entail. The reticular pattern of the checker box offered possibilities for controlled expansion, as it has been showed in cities founded in

North America, such as San Antonio in Texas.

Research objectives

This paper analyses the criteria used by the Law of Indies in the settlements of frontier towns in Latin America using as a case study the city of Barcelona (Venezuela). This research relies on urban historiography of early cities in Venezuela and the morphology structure of the historic centre of Barcelona (Venezuela) from its foundation in the XVII century (circa 1671).

Barcelona in Venezuela (current population: 350,000) has evolved in one of the major cities in Eastern Venezuela and is the third city founded in Eastern Venezuela, preceded by Nueva Cadiz (a town island no longer in place) and Cumaná. The relevance of this work lies in the fact that the historical evolution of a colonial city has been analysed with a focus in its physical structure and for the first time the city of Barcelona has gone under scholarly scrutiny of its urban form.

1. BACKGROUND

1.1 The Law of the Indies (enacted in 1573)

The process of the founding, building and later development of the urban areas in America started by the Spanish crown and which continued for approximately three hundred years was, no doubt, the greatest effort at the creation of cities and urban planning in an extension of continental magnitude without comparable precedent till the present day.

The conquerors of the New World considered the city to be an important element in the colonisation of America as it was the site at which political, military and religious power was to be found, as well as being the basic infrastructure which would allow commerce with the Metropolis through a network of population centres for the control of resources and its administration in the provinces.

The urban centres, which the Spanish found on their arrival to America, were the first centres for settlement. These frequently served as support centres for territorial expansion which resulted in new urban settlements which, in turn, became advanced religious and military population centres which would permit new conquests and greater penetration of the territories which would gradually be incorporated into the empire.

The characteristics of the land, unknown to them, and its enormous distances led to a dispersed occupation of the land in diverse geographic locations. In spite of this, relative uniformity in the founding of the new settlements was achieved (Vegas, et al. 1984).

The conquest and colonization began in Santo Domingo and then progressively extended to the rest of the Greater Antilles and later on to the continent in Mexico and Panama, from where expeditions for the occupation of South America would depart. By 1580, Spain had practically concluded its colonial conquest and occupation, initiating the consolidation of its urban network (De Mendoza 1887).

At that time, the colonizers had made a valid attempt at urban planning through the development of a model applicable to the new settlements considering that the founding and later expansion of the centres would be determined by the rigorous application of a previously elaborated plan.

The growth of the planned cities was based on a layout or regular pattern in which the exact form of the settlement was defined, the alignment of the roads, the arrangement of the blocks and the pattern for the division of the parcels among the founding members. These cities were subject to modifications in their form, both at later stages in their development as well as at the start, due to topographical adaptations or the territorial interests of its inhabitants.

The variations of the reticular pattern could be produced by the alignment of the roads or through the disparity of the arrangement and the dimensions of the blocks, with which the orthogonal pattern whose regularity in the urban structure is not precise would be called semi-reticular (semi-lattice). Generally, these modifications were the result of geographical accidents but in certain cases they were the result of the interests of the owners which wielded power over the use and occupation of the urban space.

The gridiron used in the Law of the Indies is a milestone precedent of the concept of 'partially ordered sets' (posets) of relationships also known as the semi-lattice system. This system helped the Spanish Crown to organize the new found land settlements throughout the Americas in such a way that all its components have to be determined by an open ordering system that has a central core as the departing place/space from where all functions and activities depart.

Although the grid looks rigid at first sight, it poses high flexibility as an open system that has one of the highest levels of connectivity as opposed to the existing towns of the times throughout Europe (*laissez faire* built up during the medieval period).

The eventful experiences of the first settlements established the need for regulating the foundational process of new cities in America (except for special cases such as Tenochtitlan, whose reticular layout of its channels were used as a base for the founding of the city of Mexico). As a result, a number of arrangements to this end were established by the Spanish metropolis during the reign of Charles I (1517-1556) who enacted the "General Cedula for the Founding of Cities in the Indies" (1521), the "Instructions to Cortez" (1523) the "Imperial Provision" (1526), the "Instructions and Rules for Populating" (1529), all of which permitted the elaboration of the "New Laws" (1542) during this period.

During the reign of Philip II (1556-1598) a number of norms and regulations with greater weight were drawn up (>70%) with regard to the new settlements and which were to be the instruments for the codes of the settlement centres for the colonial period in Hispanic America. This group of norms was called "Ordinances of Discovery, New Settlements and Pacification" and were decreed by Philip II in Segovia Wood on July 13th, 1573.

The ordinances were really a compendium of norms which would be considered a law on territorial and urban codes. Due to the general nature of its terms the text includes several decrees and documents which made possible to enact the settlements' organization. At the time in which the Ordinances were decreed, the main urban centres had already been founded in the colony and in general a large number of smaller cities, among which of greater importance were Santo Domingo, Bogotá, Quito, Mexico, La Asunción, Cartagena, Veracruz, Panama, Potosi, Lima and La Havana. The majority of these cities would not lose their importance as political and commercial centres and many would even become the capitals of the future Latin American nations from the XIX century onward. The Ordinances are kept in the General Archives of the Indies in Seville, in the General Indifference Section, dossier 427, book XXIX. The text that is analysed in this report is taken from the facsimile edition edited by the Ministry of Housing of Spain, under the auspices of the Hispanic Cultural Institute. The ordinances were included in the fourth volume of the *Cedulario* by Diego de Encinas, under titles I to VII in his *Colección de Incuables Americanos*. Torres de Mendoza also published them in 1887 in the unedited collection of documents on the Indies related to "Discovery, Conquest and Organisation of the Old Spanish Possessions in America and Oceania".

The content of the Ordinances comprise a number of normative principles and procedures for action which are described in the 148 chapters or articles subdivided, in turn, in three large groups in the following manner: a) The Discovery (32), b) The New Settlements (105) and c) The Pacification (11).

1.2. The Spanish conquest in East Venezuela

Two stages can be identified in the foundational process of the Spanish settlements' consolidation in the coastal sub-region in the east of Venezuela. The first occurs from the first insular settlement until the final founding of the city of Cumaná in 1569, the capitol city of de province of Nueva Andalucía (Ramos, 1980). From this moment the second stage of the conquest began which encompassed the entire functional development of the lands in Cumanagotos and culminated with the founding of Barcelona, one century later in 1671.

The territorial occupation during the first stage began in 1510 with the founding of Cubagua, uninhabited at that time. The first settlement was due to the presence of large pearl resources on the island. The exploitation of the pearls led to the spontaneous appearance of a newly founded centre, without a pre established urban plan, from 1517 on, which was called Nueva Cadiz and which from its start was dependent on water, food and labour from the less rugged territory.

In 1528, the settlement was firmly established and was granted the title of city by Carlos V although the population might not have surpassed one thousand inhabitants at that time. However, from 1539 on there was clear decline of the population as a centre for commerce and emigration of the majority of its

inhabitants to newer sources of wealth in the continent began as a result of the premature *exhaustion* of the oysters.

In 1543, Nueva Cadiz was completely abandoned and its inhabitants transferred to the neighbouring island of Margarita where a permanent settlement was made although initially due to the same reasons of economic exploitation.

Nevertheless, the island is the only stable territorial reference during the first years of the conquest and was a point of departure and operations base for the new expeditions to the nearby continent and the following territorial occupation of the east of Venezuela which would culminate with the founding of the city of Cumaná in 1569 (Martinez, 1989) and Barcelona in 1671.

1.3. The foundation of Barcelona in Venezuela

The historical development of the functional structure of the city of Barcelona is based on three basic premises. In the first place, the city was formed as a new urban centre the result of the merging of two previous settlements; San Cristóbal de Los Cumanagotos and Santa Eulalia or New Barcelona. This created a differentiation and spatial segregation of its inhabitants which was evident from the moment of the founding of the city. The former inhabitants of Santa Eulalia, who were greater in number, inhabited the central plots and were located in the vicinity of the buildings and spaces, which represented the public and religious powers (Zawisza 1989). On the other hand, the former inhabitants of Cumanagotos were located in the peripheral area on the west border of the Neverí River based on their lesser political weight.

The spatial separation referred to caused from the start, the informal coexistence of two ecclesial parishes, although this figure would not be definitely installed until the end of the XIX century. Paradoxically, both newly founded parishes were given the name of the patron saint which corresponded to the settlement. Therefore, the parish of the present cathedral was consecrated to St Christopher although its inhabitants were from New Barcelona and the peripheral parish, presently devoted to Our Lady of Carmen, was consecrated to Santa Eulalia, although the majority of its patrons came from the old settlement of Cumanagotos.

This segregation (and therein its importance) was reflected in the difference in the spatial and functional elements based upon the in nature of two different groups of inhabitants that generated a distinct urban dynamics from the start as two types of growth tendencies in the process of the city expansion: Consolidating of the original central area, density and expansion toward the river. The latter, was made in an attempt to stimulate port activities *pushed* by the inhabitants of Cumanagotos, whose settlement was older than that of Santa Eulalia, with an important commercial and maritime calling.

At this point, it may be relevant to begin the discussion of the second premise under analysis; the implementation of the Ordinances of Phillip II. As a

matter of fact, the initial *forming* and future expansion of the city was carried out formally by the construction of a perfectly reticular and orthogonal plan whose epicentre of activity was the Main Square, rectangular in form and looking toward the west, in accordance with the urban concept found in the Law of the Indies (IPC Reports 2000).

The morphology of the Main Square from where all the streets spread out at a right angle, in an east-west direction showing the inclination of the river to the city, bore the names of the religious patron saints and showed the typical arrangement of the Spanish square, even more so when the dimensions of the Square are seen to be the equivalent of two blocks and these were divided into four square plots of similar dimensions.

The reticular urban pattern of Barcelona is found in the expansion which the city underwent from 1671 to 1884 at which time the urban structure suffered considerable modifications and the process of spatial occupation of the historical centre and its nearby areas were completed. However, this process cannot be understood unless the third premise, which deals with the geographical space over which the settlement would be founded, is not analysed.

The city of Barcelona was initially located on the west border of the Neverí River the natural limit or border which was relatively isolated until 1793, the year in which the construction of the first bridge was completed. Similarly, to the south of the city the Arroyo River which today has been channelled but which at that time of the founding of the city was an important barrier to spatial growth, particularly due to the presence of large marshy areas. However, even though the Arroyo River was a barrier for urban growth, the Neverí on the contrary represented an attraction due to the possibilities which it offered as a means of commercial communication.

Based on these three previously explained premises, and the elements that modified the city in time and space, it has been considered appropriate that the functional analysis of the city be divided into four chronological periods. The first began in the year of the founding of Barcelona in 1671 and extends toward the beginning of the XVIII century. The second period covers the first half of the eighteenth century while the third continues to the year 1800. Finally, a fourth historic period has been included which covers the XIX century. It should be pointed out that from this moment, the physical expansion of the historic centre of the city had been completed and the changes that were observed were mainly with regard to the use of the soil and not its urban function. Nevertheless, at the end of the present chapter a brief description of the more important morphological modifications shall be made.

2. ANALYSIS OF URBAN STRUCTURE

2.1 First Period (1671 – 1700)

During the first period mentioned, development of the city was slow and evolved around two main east-west focal points, a third to the north and five transversal

(cross) streets which made up a total of fifteen blocks arranged form around the Main square, with a total development of ten of these while the rest showed an incipient growth, at the same time that shows the tendencies toward urban expansion (Fajardo 1992) and the limits of its growth (Fig. 1).

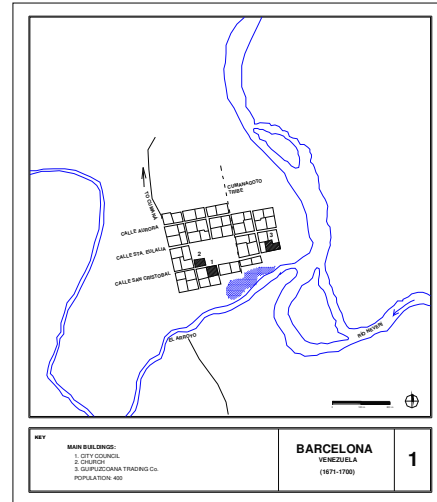


Figure 1: Reconstructed plan of Barcelona, first period.

In particular, during these twenty five years of urban existence, the city solidified the presence of fifty lots of houses which housed a population of four hundred inhabitants considering thirty families that came from the city of Santa Eulalia, while the other twenty were originally from the town of Cumanagotos.

As described in the previous paragraphs, the original urban structure during this period has been modified by the inclusion of three important buildings: the church, the Town Hall and the house of the Guipuzcoana Company. Thus, the three main powers of the colonial government, political, religious and especially the economic – commercial, were present at the beginning of Barcelona. Although these buildings were notably incipient at the beginning, their original locations would remain throughout time.

In its usual manner and as stated in the norms found in the ordinances, the church was located in the Main Square with access from the east. This first building was of a provisional nature and served the two old towns traditional parishes. This situation was maintained until 1720 when the differences between the two parishes were eliminated.

The Town Hall, for its part, was located in one of the first four houses built and particularly in one that had a balcony and doorway which is still conserved today. It is particularly interesting to note that this building was a replica of another on the opposite side and both buildings flanked the larger church. This morphological accuracy shows without doubt, the representative nature of the municipal and religious functions, *maximized in both cases as they are found in the vicinity of the Main Square in accordance to that*

established in the Law of the Indies.

Finally, it should be pointed out that during the first period Barcelona reached a population of one thousand inhabitants which, in conjunction with its geographical conditions, those of defence and communications, led to the installation of a representative of the Guipuzcoana Company in the city. This doubtlessly had a notable effect on the growth of the same and marked from its initiation the growth and importance of this commercial venture.

The Guipuzcoana house was located, for obviously commercial reasons, in the proximity of the Neverí River and was the nearest lot to this fluvial and the newly founded port area of Barcelona. The location of the Guipuzcoana House in conjunction with the commercial experience of the former inhabitants of Cumanagotos, undoubtedly led to the main line of initial expansion of the city coinciding with the extension of the San Cristóbal and Santa Eulalia streets which bordered the Square to the south and the north respectively.

This process of expansion in an east-west direction was reduced from the second period due to the irregular course of the Neverí River and the start of the construction of the Hospice or Hospital - Convent in the north of the city which was a functional element of greatest importance for the following years.

2.2. Second Period (1700 – 1750)

During the second period, which reached the year 1750, Barcelona experienced a rapid demographic growth and an intense development in its urban activities which were spatially reflected in the doubling of the occupied surface area. As a matter of fact, the city was now comprised of twenty three blocks of which seventeen were completely built up (see Fig. 2).

During this period, it is important to note the construction of the Hospice (Hospital – Convent) of the Franciscans on the outskirts of the city on the way to Cumaná.

The convent in Barcelona in honour of Saint Francis of Asis began with a slow construction in 1739 and in 1744 the chapel, the vestry and two annexes were built enabling its formal use by members of the order.

In this same period, during the year 1748, the San Cristóbal church was permanently built on the southwest corner of the Main Square on the same spot as the first chapel of the city.

Parallel to the consolidation of the religious power, there was a strengthening of commercial activity with the implementation of the ports of Barcelona and La Galera on the banks of the Neverí River which led to the installation of the Royal company of Catalan Commerce which, in conjunction with the Guipuzcoana, held a monopoly of the productive and commercial activities in the city for the first years.

These changes produced significant modifications in the urban pattern and the dynamic of the activities in Barcelona. There was an increase in the commercial importance of the axis of the Camino Real Street formerly known as calle San Cristóbal as well as the road to Cumaná and the areas near to the fluvial ports

along La Galera Street. Therefore, the occupation and urban expansion trends and the productive activities toward the north and toward the river continued thereby increasing the demand for new residential areas.

It is interesting to note that during the second period, the city did not extend toward the El Arroyo sector. This was due to the marshy ground and previously mentioned factors which together led to the city's growth in other areas.

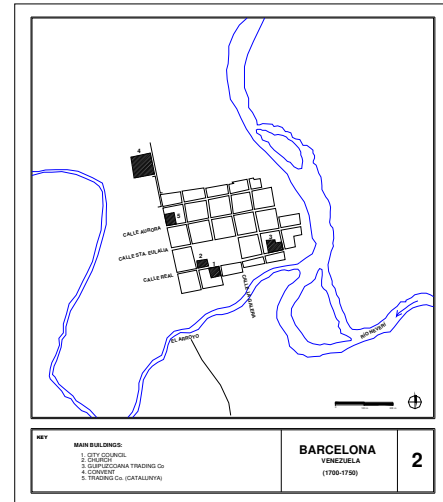


Figure 2: Reconstructed plan of Barcelona, second period.

2.3. Third Period (1750 – 1800)

In 1761, the city reached a population of three thousand inhabitants, six times larger than its original population ninety years earlier at its founding. By the beginning of the 19th century approximately forty years later still the city had quintupled its population, surpassing fifteen thousand inhabitants in the independence period.

Certainly during the third period from 1750 to 1800, the city underwent accelerated growth. During this time the occupation of the present historical centre was practically completed (see Fig. 3).

By 1777, the fourth cloister of the Franciscan hospice had been inaugurated. In 1783, the building of the upper floors was completed with the termination of the missionary work.

About the same time (1774) the construction of the San Cristóbal church, which had been temporarily halted between 1766 and 1768 as a result of a strong earthquake which had destroyed its sidewalls, was completed. During this period, commerce in Barcelona continued to maintain a certain amount of importance both on a local as well as regional level. This was evidenced by the construction of huge mansions by the Creole oligarchy that would later play an important role in the historic events of the independence period. Among these buildings, the residences of the Cajigal, Freites, Urbaneja, Anzoategui, Arquidegui, Dominici and Salavarría families should be noted.

With regard to the functional structure of the city, the construction of the bridge over the Neverí, the Portugal Bridge in 1795, stands out. This generated intense urban growth on the right bank of the river over the port quarter of Barceloneta or Portugal. In said sector, the public city jail—which had been partially destroyed by the building of the bridge—was sited. It served as a government house for a brief period.

Due to the construction of this bridge, the commercial activities on Santa Eulalia Street were developed in a parallel fashion to the dynamic of the High street. Both, long with La Paz Street, the old route to Cumaná, represented the main corridors of urban activity during this period, maintaining its importance in the structure of the city to the present day.

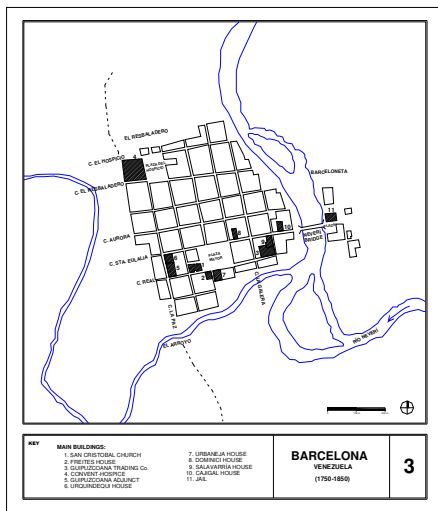


Figure 3: Reconstructed plan of Barcelona, third period.

In the same vein, the expansion of residential activity led to the creation of the El Resbaladero quarter in the north of the city in the vicinity of the Franciscan hospice. Parallel to this, the bank of the Neverí was occupied while the El Arroyo River continued being the southern limit of the city. At that time Barcelona was made up of 44 squares or blocks divided following the colonial reticular pattern. It should be pointed out that the size of the Main Square continued being reduced in favour of religious and commercial activities at the same time as a slight distortion in the square pattern in the El Resbaladero quarter began.

2.4. Fourth Period (1800 – 1900)

In the fourth and final period identified, that reaching 1900, the expansion of the city spans the era of the War of Independence and the first half of the Republican Regime (See Fig. 4).

In the first twenty years of this period, war wrought huge destruction on the structure and morphology of the city. Most important was the Battle of Barcelona in which the patriots used the Franciscan convent as a fort for defence. As a result, this building, today in

ruins, would later be christened Casa Fuerte in 1817.

Among other important elements in the urban landscape of the time, the enlarged San Cristóbal church and the building of the Municipality over the old Main Mayor, called Plaza Principal in the first Republican Period, should be pointed out. As a result, said space was substantially reduced and ended up in the form of a square. The other square which remained in the city is known as Libertad (Freedom). It is the former Hospice Square considering that the present Rolando Square was not built until the demolition of the block which it presently occupies at the beginning of the present century.

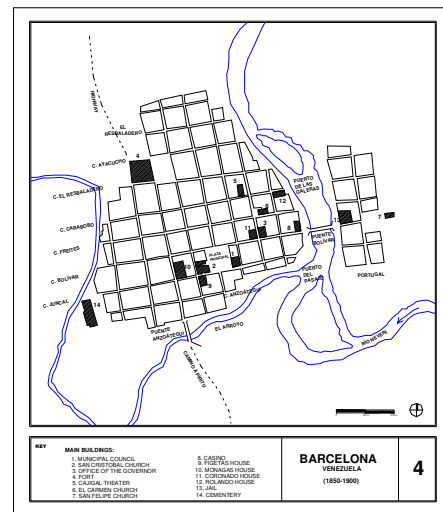


Figure 4: Reconstructed plan of Barcelona, fourth period.

On the edge of Rolando Square the National Theatre, today known as Cajigal, and the Church of El Carmen were built, the former in 1895 and the latter toward the end of the nineteenth century. It should be mentioned that the church of Ermita del Carmen would serve as the new parish in Barcelona -an ambition which as we have seen- stems from the first years of the founding of the city.

During the fourth period the final solidification of the historic centre was completed as well as that of the first peripheral quarters such as El Resbaladero in the north; Cayaurima, Dos Caminos and San Pedrito or Buenos Aires in the west; La Aduana and El Arroyo in the south; and Guamachito, Portugal and la Barceloneta on the right side of the river. The emergence and consolidation of the quarters on the other bank of the Neverí prompted the building of the San Felipe Church in the vicinity of the public jail.

In the same fashion, the access roads to the city at the end of the century were improved by the construction of the Guzman Blanco Road connecting Cumaná, the Anzoategui Bridge on the road to Piritu and the Pozuelos Road on what is today Cajigal Avenue. These improvements in the access routes were accompanied by maintenance work on the

infrastructure of the fluvial ports of El Pasaje and La Galera and by the remodelling of the bridge over the Neverí, rechristened Bolívar, after the War of Independence.

The economic surge of the city in the second half of the nineteenth century, in conjunction with its standing in government in the new republic as well as with the improvements in the city's communication infrastructure, substantially changed the structure and dynamics of its urban activities. This is evidenced by the erection of a casino in the city, the inauguration of the cemetery in 1892, the running of a university college between 1885 and 1893, and the construction of public buildings such as the Municipality and the government building.

The subsequent developments of the city in general and the historic centre in particular have been conditioned by the changes undergone during the latter part of the nineteenth century. It was then that the pattern for locating activities was defined. The function of the centre as a mixed commercial and residential area was also defined then, although commerce tended to progressively displace residential homes as a historic trend.

3. RESEARCH OUTCOME

The analysis of the urban structure of the city of Barcelona should be undertaken both from the perspective of its physical and spatial structure and from the typology pattern of the buildings and the layout of the roads. These are compatible with the conditions established in the Ordinances for the New Settlements. This means that the location of Barcelona in an extensive fluvial plain where the only immediate border is the eastern bank of the Neverí River rendered the possibilities for the continuing of the semi-lattice pattern.

These geographical characteristics permitted the formal implementation of the stipulations contained in the Ordinances of Philip II without any notable resistance posed by the physical terrain. This is evidenced by the fact that the reticular pattern remained unaltered in Barcelona until the end of the nineteenth century. The first result of this analysis is therefore the implementation of the urban norm established by the Law of the Indies. The norm was conditioned by the geographical factors that determined the possible physical expansion and the dynamics of the newly founded urban structure in the initial years.

It is especially important to mention that toward the end of the eighteenth century the population of Barcelona managed to overcome the physical obstacle of the Neverí River by constructing its first bridge. This permitted permanent and vital communication with the other side of the river and constituted the first important structural modification of Barcelona. This new communication link was the first step in spurring on the development of other peripheral areas and led to stabilizing diverse activities for the storage, exchange and distribution of products coming to the interior of the country via the port area.

Thus a trend of urban growth was revealed, first in the traditional city centre of Barcelona and from there towards the outskirts. It can therefore be stated that the peripheral quarters on the outskirts of Barcelona comprised, until the beginning of the 20th century, an extension of the central area. The morphological traits of said outskirts are very similar to those which are present today in the central area.

Geographical location is not the only element which determines spatial growth. Cultural patterns unique to the region, patterns which impart special characteristics to the city, should also be kept in mind.

From the beginning, Barcelona was an important point in linking the east of Venezuela with the Captaincy General of Caracas. This role was reinforced by Barcelona's proximity to the port of Cruz (today known as Puerto La Cruz) which, like other ports in America such as la Verdadera Cruz (today Veracruz in Mexico) to name but one, comprised access and exit ports for indigenous products. This strategic position as a link between the governments of New Andalucía and Venezuela made Barcelona the main commercial centre of the East of Venezuela.

Cumaná arose similarly. It was the first populated settlement for advance military and religious entities on the continent. Its position as the first city and its early consolidation quickly made it the leading military and political centre of that provincial area. This led to the construction of permanent forts and castles which gave it an important cultural legacy. However, the distance from the Captaincy General and the discovery of a nearer, alternative port gave Barcelona the edge as an important location in the region.

4. SEMI LATTICE ANALYSIS

The term semi lattice is referred as a mathematical concept with two definitions, one as a type of ordered set, the other as an algebraic structure. Both definitions have order theory as the basis for relationships that capture the notion of extended ordering of sets. The semi lattice definition adopted in early adaptations to urban sets analysis is that of the partially ordered sets (posets). Semi lattice analysis was first applied to understand urban systems by Christopher Alexander in the milestone article, "The City is not a Tree."

In this case, semi lattice theory serves first to expose the ordering principles of the Law of the Indies, and secondly to demonstrate the partially ordered subsets that define Barcelona growth in a 200 hundred years span of time. While growth in history has been defined as a linear phenomena the various events that affect growth are not. To understand this, the analysis of Barcelona will be revealing for an understanding of the systems that operate in the city.

4.1. First Period

The establishment of the city began with the basic urban elements such as the grid that accommodated 30 families the main Plaza, the Church and Guipuzcuana Company which acted as trading company by appointment of the King of Spain.

Urban life was along the Calle Real and I found to main subsets of urban activity; one around the main Plaza, and the other where the Guipuzcuana Company was located. In Fig. 5 it can be seen the relationship among activities (see key on Fig. 1).

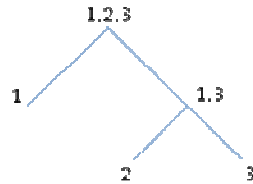


Figure 5: Semi Lattice Analysis, first period.

4.2. Second Period

The second period is characterized by the expansion to north due to the creation of the hospital on Calle de La Paz where it also was located a second trading company managed by the Catalunyan Province with permission from the King of Spain. In this case the creation of the Hospital and the Catalunyan Company partially offset the location of the Guipuzcuana Company, strengthening the western side of Barcelona in the first half of the XVIII century (see Fig. 6)

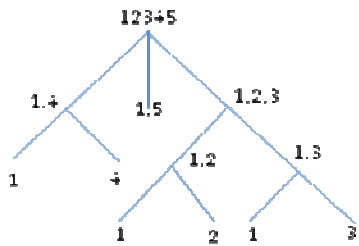


Figure 6: Semi Lattice Analysis, second period.

4.3. Third Period

With a time span of 100 years the city grew at steady pace where the major features are the jail on the other side of the Neveri River and the bridge that connect it to the city. These additions to the urban fabric brought new meaning to Sta. Eulalia Street transforming it into the new main street that opened Barcelona growth from its confinement beyond the river (Fig. 7).

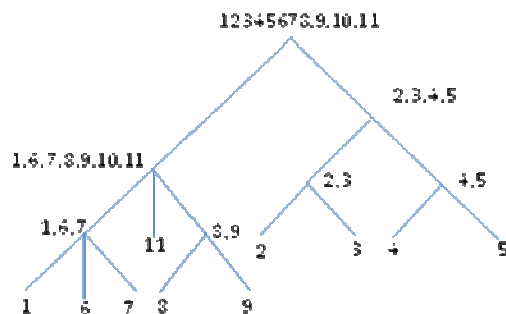


Figure 7: Semi Lattice Analysis, third period.

As a result, two subsets of activities become more balanced than in the second period. On one hand the subset marked through the Calle Real and Calle de La Paz and on the other, the subset of Sta. Eulalia Street. The former is mainly characterized by religious activities (Church and Hospice) and the Catalan district and the latter, with governmental and trading activities. This period was also characterized by the Independence war from Spain.

4.3. Fourth Period

This period is marked by the different Governments of president Guzman Blanco who was in office much of this last half XIX century (1870-77; 1879-84; 1886-87) 13 years in all. This period was signed by transformation and the passageway from a colonial province to an independent country with all obstacles that this might mean in the path to become a modern State.

During this period Sta. Eulalia Street became Bolivar Av., the Cajigal Theatre (following the French tradition of the times) was built, and Barcelona became the Capitol city of the newly created Anzoategui state.

The subset of activities marked by the Church and the Hospice were strengthened with a new City council building and a new cemetery on the western side skirts. Although, the La Paz – Calle Real subset was consolidated, the Bolivar Av became more prominent throughout this time since all governmental and commercial activities settled in and around this subset. This trend paved the path for the foremost and future development of Barcelona and the early XX century highway 9 that would connect the city with Caracas and with its natural seaport; Puerto La Cruz (6 miles away). In Fig. 8 it can be seen (on the right) where most activities are located

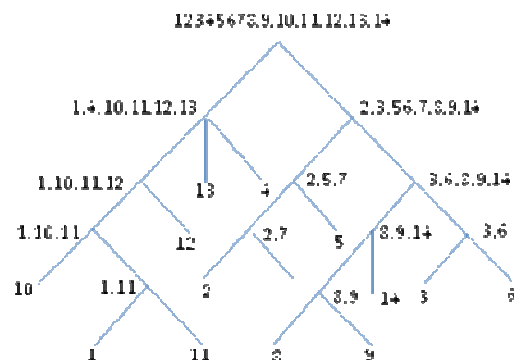


Figure 8: Semi Lattice analysis, fourth period.

The magnitude of activities that took place along the riverside informs again the importance of water courses to establish human settlements. It also tells that the development took place where city dynamics were higher and closer to ways of connectivity with the 'out of the town' roads to other centers.

Although the growth in Barcelona and all cities in Latin America took place around the main Plaza following a

sort of concentric development where all the above mentioned activities determined the organizational structure of the city, giving its identity and sense of place. In the case of Barcelona, the linkage across its own borders with other settlements was crucial to create a distinctive urban fabric pattern and an identifiable urban morphology

CONCLUSIONS

Barcelona still evinces the conditions set out in the Ordinances of the Law of the Indies for New Settlements. The Ordinances constituted a model for development adaptable to local topographical conditions. Barcelona's strategic location within the region was fundamental to enact the political functions that facilitated to carry out the territorial occupation and colonization of Eastern Venezuela.

It should also be pointed out that Barcelona's proximity to the Captaincy General of Caracas made it complementary with regard to the latter. On the other hand, Cumaná played a role as a link with respect to the East of the country. For that reason, the urban development of Barcelona would flourish within the parameters of commerce and a unique geopolitical position.

Therefore, it is important to highlight the validity of the 1573 Ordinances of Philip II, the influence of which is found in the present urban structure of Hispanic American cities. Barcelona constitutes one of the clearest examples of the implementation of the regulations to direct the foundational process of the new settlements in the Americas.

These regulations were based on a number of urban planning and sanitary principles. These principles in turn fostered order and organization over the colonization process in Latin America and that blended the Old World cultural traditions in the New World population centres.

On the other hand, the semi lattice analysis give us new insights about the underlying principles embedded in the Law of the Indies such as the creation of magnet components that are dynamic agents that foster further development. These components sustain a wide array of activities as the "wide variety of ensembles" (Alexander 1964) represented in the natural organisms and its linkage with the physical environment.

The dynamics generated around these unique places determine the centralities around which the city functional structure develops and if balanced, create sustainable environs.

Semi lattice analysis helps us out to determine the existing subsets within the city system thus, revealing the operational structure about how the city functions.

The principles, conceived more than 400 years ago, are still prevalent as ordering concepts in modern city planning and urban design. The most notorious is the centrality principle, which allows flexibility in the reticular plan consistently based on a cellular configuration that is open ended and highly adaptable to further development that in turn, drives into a more cohesive and balanced sets of land use patterns.

All in all, the Ordinances of Phillip II along with existing native human settlements most definitely marked the foundation of city design principles that led to modern urban planning and design development in the Americas.

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