Urban Morphology and Residential Typology: A Case Study Approach of Expanding Cities in Venezuela

by

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ABSTRACT

This thesis deals with the morphological problems of urban expansions in the towns and small cities in Latin America, particularly in Venezuela, which in their physical structure contain the major elements and patterns of the colonial grided settlement. The morphology of the urban-scape constitutes the spaces and the volumes that define them, also referred to as urban form.

Many small cities in Venezuela are experiencing growth and raise the problem of continuity between the traditional and modern city planning concepts. A polemic and a proposed resolution of these two conflicting models of the urban environment are the major concerns of this thesis.

The present rules or ordinances governing urban expansions in Latin America have become what I call, bureaucratized versions of the City in the Park. My main concern in this work is to propose a different model of urban form which attempts to explore the generic potential of the traditional fabric, while adapting and restructuring it to cope with modern needs.
The major part of the work is a design study dealing with a projected growth for a small city in Venezuela. This method of physical projections seems appropriate because it offers verifiable proof of architectural ideas, reinforces as well as generates theories, and last but not least can be subjected to constructive criticism. Another part of the thesis contains the dimension of issues and urban design positions relevant to the alternative urban growth form developed in the design. Some of the important aspects are:

- The capabilities of a continuously built environment and strategies which can be used at the different levels of urban design.
- The implementation tactics underlying the development of the new expansions of the growing cities.
- The process of decision making for the suggested alternative, and its relevancy to current needs of Venezuelan cities.

Finally, a partially annotated bibliography for expediting future studies in the area of Colonial Urbanism and the elaboration of theories and alternatives regarding this theme, is presented.

Thesis Supervisor: Imre Halasz
Title: Professor of Architecture
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This thesis is dedicated to Isabel.
BACKGROUND AND POLEMIC

Through time many ideas concerning the issue of urban form have evolved and still today theories continue to emerge. The figure on the opposite page shows a collage representing three types of urban development solutions: the one in the foreground represents the notions of the past with a low-rise continuously built environment and spaces as positive elements, another the high-rises in the middle, expresses the present as a deformed version of the City in the Park with the solids as the positive elements, and finally one example of a futuristic model of a city shown in this case as an amplification of the present high-rise system.

Latin America has had its share in the evolution of these three paradigms of the built environment and particularly of the first two which are the ones of interest for this discussion. The futuristic model is not considered in this discussion because it is essentially a science fiction version of the present model of the city.

Science Fiction identifies itself with mega-buildings, lightweight throwaways,
plug-in variability, over-city-grids-ironing-board over Stockhohm, waffle-iron over Dusseldorf-linear cities, integrations of buildings with transport, movement systems and tubes.¹

It continues to be objects in space disregarding the existing context and, therefore, having no more transcendency than that of its picturesque values representing the powers of the imagination where all the problems of the green city are stacked up. Furthermore, it has very little relationship with the chosen context where not even a medium level of technology exists.

The other two models are distinct types, each being the opposite of the other in terms of figure ground relationship. While the morphology of the modern city model can be described as being made up of buildings as space occupiers, the traditional city model contains buildings that are space definers. In the modern city the objects express their functions while in the traditional one the objects are the spaces and there is no clear expression of their functions.

We can find examples of continuously built environments as well as modern high-rise developments all over the countries in Latin America. Nevertheless, the ones that are known the most, are examples of the second
category: the modern city, the green city. Many projects and plans that will be discussed later, representing various versions of the green city as it was applied in the Latin American context have been publicized. No attention or very little has been given to the Old Colonial cities representing the conception of urban space as the important organizing element of the urban morphology within a continuously built environment. Today many high-rise environments are continued to be built, and in Venezuela for example, where the situation is such that growth, construction and change are occurring, more versions of the City in the Park continue to proliferate. The introduction of steel and concrete frame plus mechanical services (elevators, etc.) provide the technical incentive to go high. In Venezuela this is not as clear as in the industrial countries because of its less developed stage. Another important factor that contributes to this proliferation is the speculation in land value that goes hand-in-hand with modern city planning and that is evident in the Venezuelan environment.

Many, if not all, of the old cities and towns in Venezuela like in all the other Latin American countries still have the elements and patterns of a Spanish-colonial grided settlement. The Spanish conquerors
imposed their way of life and brought with them an urban tradition. The possible origins$^2$ of the regularity of the resulting urban form of the colonial settlements, which was perfected through time, can best illustrate the context in which present day expansions are occurring:

- the Hippodamian Grid Systems (Miletus, Priene, Olinto ....)
- the military practice of the Roman Castramentatios as seen in the orthogonal grid plan of the Roman cities and colonies that remained through the Mediterranean (Turin, Pavia, Timgad, Lambesi, writings of Vegetius and Polybius).
- the medieval Bastides, cities in the south of France (Montpazier, Ste. Foy le Grande, Villeneuve, Mirande, Aigues Mortes, ....)
- the direct examples of castramentation practices in Spain that would have been known, directly or indirectly, by the first administrators. (Puente La Reina, Sanguesa, Viana, Almenara, Castellon, Puerto Real and Santa Fe).
- the theoretical formulations and the ordinances and instructions given by the Spanish kings De Regimine Principum work of Santo Tomas de Aquino
(1267-1284), the theories of Eximenic (1381),
the writings of Rodrigo Sanchez de Arevalo (1404-
1471) La Suma de la Politica, ... and the instruc-
tions especially made for the new colonies; In-
structions to Pedrenis in 1513 by Fernando el
Catolico, Las Layes de Indias, (1526) given by
Carlos V and the Ordenanza de Nueva Poblacion,
given by Felipe II.

* the unfortified regular cities built in the south-
east of France and in Italy between 1500-1520.
(Vallauris, Mounas, Sartoux and Valbonne in France
and Grattinara in Italy).

* the influence of the theory and practice of the
Italian Renaissance (reconsideration of the
classical themes of Vitruvius, the military
writings of Machiavelli, the treaties of Alberti,
Filarete, Francesco di Giorgio, da Vinci, Palladio,
Scamozzi, Serlio, Cataneo, ...).

* the existing pre-columbian urban geometry (Cuzco,
Tenochtitlan, ...).

All of these in one way or another, and to a greater or
lesser extent influenced the morphology of what are
considered today the colonial cities and towns of Latin
America.
Venezuelan cities share these characteristics and there are plans that show some of the original layouts. Some of them can be very geometrical and clear while others more picturesque and abstract. The geographical location and climate did affect their urban form. The Royal Ordinances prescribed narrow streets in hot areas and wider for the cooler ones, but influences like the function of the city and their time of foundation was much stronger. The mining cities were usually irregular but in general, through time, most of the cities became more and more regular. The important point is that even if not all were built in the colonial times, or did not obey the Royal Ordinances to their fullest, the traditional grid system was kept until modern times when different ideas of urban form were imported.

This rational, economical and simple solution, that even with houses with private patios reached a density of 300 hab/ha (in one and two stories) becomes non-eroded by the importation of the 'bungalow' from North America as well as by the ideas of the C.I.A.M. which became influential in 1930.

It is important to see the origins and applications of the modern city in Latin America in order to understand what is being done in the present urban expansions. We can go back to Le Corbusier's 1922 exhibition in the
Salon d'Autome in Paris where studies for a 'Contemporary City for Three-Million Inhabitants' was shown. At this point the modern city, a new model with transcendent ideas and influences, was born. One must mention that there is a continuity from the 19th century ideas of Garden City to the projects and writings of Sitte to Le Corbusier. We start with Le Corbusier because his projects represent a significant stage in the evolution of Modern Town Planning and its influence in America. In 1925 in the Plan Voisin of Paris the ideas were given a context and at that time they referred back to the 1922 exhibition as words in a desert because now everything seemed more realistic and more palatable. Before 1930 when all the theories of urban design were expressed as the Radiant City, sketches of projects for Sao Paulo and Rio de Janeiro in Brazil, and for Buenos Aires in Argentina were done by Le Corbusier himself. The direct influence continued in 1936 also with some studies and proposals for Rio de Janeiro and a project for the Brazilian University. In 1938 another proposal for Buenos Aires and then in 1950, in Bogotá, Colombia, the last urban project of Le Corbusier in Latin America was done. But long before this last one, others had been following Le Corbusier's ideas and Jose Luis Sert was one with his share of proposals for new garden cities and conversions of old ones in Latin America. His major
projects were: A new settlement called Motor City in Brazil in 1945; the new city Chimbote, Peru, 1948; the master plans for Medellin and Bogotá in Colombia in 1949 and 1951 through 1953 respectively, and the pilot plan for La Habana, Cuba in 1955 through 1958. Graphical information is enough to show how the Modern City was expressed in Latin American context. Of course this trend continued, now by local architects who rapidly understood the concepts of the City in the Park, of objects in space and of La ville verte, soleil, espace, verdure.

Versions of all the scales developed, varying from an entire new city called Brasilia in Brazil, designed by Lucio Costa (Planner) and Oscar Neimeyer (Architect) in 1957, to developments like the Pedregulho in Rio de Janeiro, Brazil done by Eduardo Affonso Reidy in 1950. We can find many other examples by two other outstanding Latin American architects: Oscar Niemeyer from Brazil and Carlos Raul Villanueva from Venezuela. Some of their major projects have been graphically represented and they clearly express the influences of the Modern movement. All of these ideas did not remain at the will of the architects who understood them, they filtered into the ordinances of urbanism as early as 1930 in Buenos Aires where we can see that verte,
soleil, verdure was correctly translated into Spanish as "aire, sol, vegetación" in order to become the Symbol of Urbanism with all its morphological implications.

Today, the City in the Park has been bureaucratized into many versions, all of which control the definition of the building as an object instead of that of the urban space, and some are ready to be used in the small expanding cities and towns like the ones of Venezuela.

Many of these cities and towns are still intact because developments have occurred mainly in the major settlements. The situation is such in Venezuela that now even the small cities are growing especially if they are close to booming industrial centers. I believe, therefore, that there is a need to study the traditional urban form of plazas and patios not for making replicas in the present expansions but to understand their potentials and develop useful morphological and theoretical abstractions much needed in the present day vocabulary of urban design. When expansions occur, a reasonable continuum of the existing urban texture is always missing and when interventions take place within the old structure of the city no consideration is given to the surrounding context. The city of continuous solids

then becomes the city of continuous voids. Maybe it happens because there is a lack of understanding of the old system but maybe the reason is a completely different one, and it is because the officials that establish the rules are following the norms that prevail in the country, as well as others, and it is the only model they have. It certainly does not happen because there is a need for higher densities, often the need is the same or lower.

On the one hand, the traditional city model was rejected because of lack of air, light, hygiene, etc., and on the other, the modern city model by conforming to the dictates of vehicular activities, the rational form of housing and distribution of functions, it is now being rejected because it disrupts the existing fabric, and promotes crime and alienation. It destroys the essentials of the traditional environment by creating a fabric devoid of an imageable and comprehensive (or even existing) urban structure without positive definition of space, in great need of individual expression and incapable of growth and change.

We are here confronted with two very different pathologies; one of the body: lack of light, air and hygiene; and one of the spirit: lack of public space
6. The rejection of the buildings that do not form a describable space, illustration from Rational Architecture by L. Krier.


On the other hand we can not simply imitate the past, however nostalgic or fashionable. There are certain characteristics that can be transposed to the present context: maintaining a close field for perceptual experience, making public spaces as the predominant figure defined by the private built ground, creating a better definition the public and private realms, allowing for growth and change, etc. The public space being stable and predictable, allows for unpredictability in the built, therefore being capable of adapting to modern needs and social changes. For example, housing types can be developed to conform to hygienic standards, cope with urban space definition, and permit unpredictable growth and change. The problem becomes one of balance between public space elements and the private ground. 19
Many opinions have been given as to what was the most influential element (antecedent) of the gridiron pattern of the colonial cities in Latin America. Here we are interested in presenting the material encountered in different works without giving emphasis to any particular one, and using mainly graphical information. Among historians we find different hierarchical orders for the various sources of influence: Gabriel Guarda and Leopoldo Torres Balbás stress the direct Spanish origins, Manuel González Galván and John McAndrew emphasize the Indian influence, Leonardo Benevolo, Erwin Walter Palm and others make important the Renaissance ideas, etc. Maybe this happens, we say, because no such generalization can be done.

The colonial grid pattern can be easily related to the Hipodamian grid system like they are in Mileto, Olinto, Alessandria or Priene. Their minimal differentiation of the grid can be compared to many Latin American cities and it can be seen as a logical historical source of reference for a country in need of models of cities.
The work of Flavio Renato Vegecius Rei Militari is a Treatise on the classical technique of the Roman castramentation that was available to the Spaniards before and at the time of the conquest. It was used through the Middle Age in Europe, and in Spain we can find some examples going back to Puerto de La Reina in Navarra up to Santa Fe in Granada, together expanding the period between 1104 and 1492. We must bear in mind that the first city laid out by the Spaniards was Santo Domingo in 1502 and that it was done by Nicolas de Ovando who had lived in Santa Fe de Granada.

Most of the cities in Spain at the time of the colonial expansion in America had a Medieval pattern without an existing central plaza. Because of this other sources can be said to have influenced the urban form of the Latin American colonial cities and, indeed, we find many others. For example the French Bastides, regular fortified cities at the south of France, existed and were known at the time of the conquest. The Bastides could be said to be the equivalents of Spain's Puerto de La Reina or Santa Fe because they were grided, fortified cities built in the Middle Ages, but in France, we can find more and better examples like Villeneuve-sui-lot, Montpazier and Ste Foy-la-Grande. Certainly, this source cannot be discarded as a possible influence or origin of the colonial urban form.

In his work De Regimine Principum, the great theologian of the XIIIth century St. Tomas de Aquino who was known all over Spain, gave such precise instructions for the founding of a city that it can certainly be said to have had a degree of influence. Specially if we know that Juan de Cardenas the secretary of Pedro de Valdivia, the founder of Santiago de Chile in 1514, brings a copy of Santo Tomas de Aquino's work with him when the layout was made. El Crestitia Eximanic, a catalonian monk who lived from 1349 to 1409, is another work which describes the laying out of an ideal city where similarities to the colonial ones can easily be detected. This in turn can be compared to the French Bastides like the ones we mentioned and to the Spanish cities like Santa Fe and Puerto de La Reina.
of Guatemala and Trujillo show morphological features that reveal Renaissance concepts of the ideal city. Spain was therefore well aware of the classical themes in Vitruvius, the military writings of Machiavelli and the treaties of Alberti, Serlio, Palladio, Filarete, Francesco di Georgio, etc.

Most of the cities in Latin America were not fortified therefore, cities like Vallauris, Mounas, Sartoux and Valbonne in the southeast of France or cities like Grattinara in Italy that were founded between 1500-1520 without any fortification must be recognized and mentioned as another source of influence. These examples were not only built without any fortification, like the colonial cities, but had a regular grid pattern as well.

The theories and practices of the Italian Renaissance with the formulations of the Ideal Cities is a source of influence that can not be neglected nor disguised. The theme of an ideal Renaissance city as a model of the universe transforming to house specific functions, like military, can be compared to the utopia prescribed by the Spanish King's ordinances and their actual applications. Direct comparisons have been made of the Spanish ordinances governing the laying out of the new cities to the writings of Vitruvius and also similarities of other sections of the norms to Alberti's ideas and Palladio's Quatro libri dell'Architettura have been mentioned. The Renaissance influences to the development of the Spanish cities in the New World are not only detectable at the level of the norms. Examples like the layouts for Panama, Campeche, the new city

"...From the plaza shall run four main roads."
Since the beginning of the conquest Spanish Kings and administrators issued instructions regarding the founding of cities. At first they were very vague like the one in 1501 written by Fernando el Católico to Nicholas de Ovando, governor of Santo Domingo. The king's main concern was the location of the city. Slowly the instructions get elaborated through the 11th century. In 1513, again Fernando el Católico, gives more concrete instructions to Pedrerias Davila, this time specifying a concern for the position of a main plaza and the distribution of the lots. In 1526, Carlos V in view of the great expansions in the new continent issued a set of ordinances that are more specific but it was not until 1573 that Felipe II published the Ordenanza de Nueva Población which is an ample set of norms that form part of a large legislative document. It is this last one that has been compared to Vitruvius, Palladio and Alberti and were the most specific rules regarding the morphology of the cities are found. Among the 148 ordinances intended to regularize the city planning in the colonies, numbers 32-42 deal with the location of the city and numbers 111-137 are the ones that deal with the form of the city and the position of various elements.

These norms were probably based on all the sources we have mentioned plus the Spaniard's own experience in America. Even if the famous proverb of the founders obedezco pero no cumplo (I obey but I don't comply) was exercised, the ordinances can be but a possible influence to the resulting urban patterns.

Even though the possible influence of the existing geometry in the Indian settlements has been discarded by many and the Spanish imposition of their traditions was a reality, some relationships between the Indian urban settlements and the new colonial cities are worth mentioning. An important one is the presence of Central Plazas. The existence of these major spaces in the native environments can be but a reinforcement to the new Spanish settlements, specially if one realizes that the square as such did not exist in Spain.

This aglutinating urban element which was a tradition in the native urban life was to be used by the Spaniards in the same manner. Four main roads leading to the central square were also present in many Indian cities and in many instances they caused, as attested by in some chronicles, a great impres-
All of these sources in one way or another, and to a greater or lesser extent influenced the morphology of what are considered today the colonial cities and towns of Latin America and what constitutes the traditional urban pattern.


### INSERT 2:

![Image of Paris map with dates 1922-1925]

THE EROSION OF THE TRADITIONAL URBAN FORM IN LATIN AMERICA.

We must be aware of the achievements of 19th century engineering and technology, the appearance of the railroad, the evolution of bridge design and construction, Haussmann's Paris, the theories of the Green City, etc. that lead to the creation of 20th century ideas of urban planning. For our purposes it seems logical to start the origins of the modern city in Latin America with Le Corbusier, because not only was he well known and influential all over the world but his projects fully represent significant stages in the development of modern town planning, and at the same time he had direct influence through his projects and proposals for specific countries in Latin America.
The years 1922, 1925 and 1930 are key dates in terms of the evolution of the new concepts of the city. In 1930, in the Radiant City, the centralization of density and services is fully exploited and the notion of traditional urban space has become something of the past.

Before the elaboration of the Radiant City, Le Corbusier in his travels through South America did these sketches for three different cities. The buildings in these cases are endless objects trying to put order to the confusion down below due to the urban expansion. They are of such scale that even geographical features, such as the mountains, are being organized by them.

The crossing of the never-ending buildings, present in the schemes of Sao Paulo and Montevideo, represent the opposite, in terms of figure ground, when compared to many traditional city schemes where our main roads (spaces instead of buildings) lead to the center of town. This traditional pattern used in the Roman castramentations is also prescribed in the Royal Ordinances governing the new colonies of Spain in America, and it is even present in major urban settlements of Pre-Columbian America: Teotihuacan, Tenochtitlan, etc. In Le Corbusier's proposal the spaces (streets) have become the buildings and the rest is also inversed. Therefore, like R. Krier wrote,

...the buildings, stretching for miles, are forced to adopt the form of the street plan, which from a town planning point-of-view is not of great value.1

In the scheme for Rio de Janeiro, LeCorbusier adds to the endless buildings towers in space. The free standing building or Unite d'habitation makes its first appearance in the Latin American context. In this particular sketch we can perceive the devastating scale of the scheme where the buildings compete with the mountains and where the notion of the traditional urban space is completely absent.
31. L.C.'s planning sketch for the center of Bogota, Colombia, 1950.

The 1950 sketch of Le Corbusier for Bogotá being compared to the existing urban fabric is probably one of the best examples where we can see how the traditional urban space is dissolved and how the buildings become objects in space. The plaza is no longer defined and it has spilled over in order to be able to do the new architecture of solids as objects in an environment of continuous undefined space. The plaza is no longer recognizable as an element the buildings are the elements now.

32. Jose Luis Sert's proposal for the new city of Chimbote, Peru, 1948.

In the two new city proposals of Jose Luis Sert we find again similar notions of modern city planning. The ideas have been refined and developed to fit a more realistic context, but again urban space in the traditional sense is missing. We must remember that J.L. Sert worked in Le Corbusier's office in 1929, the year that Le Corbusier travelled through South America. J.L. Sert's proposals also express the breaking down of functions through the city, an idea that can also be seen as a result of gradual separation of functions by modern industrial work, but that today has proven to have a negative influence on urban life.

33. Aerial view of Sert's Motor City proposal, Brazil, 1945.

34. Collage of Sert's Pilot plan for La Habana Vieja and the existing condition.

The Pilot Plan for La Habana Vieja, here compared to the existing urban pattern by means of a collage, is a very important project that shows the attitude when working within an old structure. This particular scheme changes the scale of the block for them to become a version of a superblock and destroys the definition of the street by the constant introduction of spaces that connect to it.

35. Plan of Brasilia, Brazil, architect O. Niemeyer and planner Lucio Costa.

36. Aerial view of Brasilia's residential sector.
Brasilia can be seen as the culmination of all of the ideas of modern city planning. Its magnitude gave way to the desintegration of all the traditional patterns and to the expression of the separation of functions within the city. This was the only project done of such scale, nevertheless we can find many other examples of lesser magnitudes but where the modern ideas are present. The following comparison of a sketch by Le Corbusier on the left and one by O. Niemeyer on the right clearly expresses the degree of influence.

37. Corbusier's (left) and Niemeyer's respective sketches for density-form

38. Oscar Niemeyer housing proposal.


40. 23 de Enero, housing project by Carlos Haul Villanueva, Caracas, Venezuela.

The last three projects are examples of the complete integration of modern ideas of the new model of the objects in space.

Probably the most important aspect concerning the disintegration of the traditional concepts of urban space is the filtration of the ideas of modern city design into the planning ordinances for the Latin American Cities. Here we have an example as early as 1930, from Argentina. In the present day almost everywhere the laws are written in such a way (setbacks, % of coverage, etc...) that they prescribe buildings as objects with as many variances as you can think of. The bureaucratisation of the City

in the Park is all over Latin America and this is probably the most threatening aspect to the traditional environment.

41. Argentina's proclamation of the new symbol of urbanism in 1930 (see beginning of fourth title line: "Aire, Sol, vegetacion..."=air, sun, vegetation.

THE PROBLEM

DEFINITION

The objective of this thesis is to take a specific situation of a growing city in Venezuela, that still has the major elements and patterns of a colonially grided settlement, and through an urban problem of a probable expansion, study different theoretical points of view that deal with the urban morphology, growth and change of cities. This will be done in order to propose an alternative set of themes that could be used for the future expansions of the particular city I have chosen to study, and actually try to express them through an example of urban design. The problem can be defined as: Given a presently growing small city in Venezuela that was originally laid out according to the colonial grid pattern tradition, establish certain morphological issues that could be used as guidelines for a specific project in the physical structure of the given city.

The purpose of choosing a particular case and actually doing an exercise on urban design is to discuss different theoretical points of view within a given context; making the resulting alternative relevant.
to similar situations that exist all through Latin America and particularly in many towns and cities of Venezuela that still maintain the original colonial grid patterns. The project will then be useful to derive a set of suppositional themes that could be present in other expansions of different towns that share similar characteristics regarding the Urban Form.

It is important at this point to say that the objective of this study is not to create a new theory of Urban Design, but rather to test existing theories in order to see how they relate to the chosen context. Furthermore it must be clear that it is not the objective to do a historical analysis of the colonial cities, because I do not pretend to give a new version of these particular events in time, nor do I pretend to fill in missing facts. I will simply bring existing historical information, when needed, in order to make a particular point regarding the main discussion.

It is also not the objective of the thesis to examine in detail a particular social, economical or technological problem related to the growth and change of the study area. I am well aware of the importance of these topics but my main concern is the issue of urban form and how it can affect them. In other words,
we can say that these themes will be subordinated to the morphology of the urban scene because I am not interested in suggesting a physical structure that would constitute a replica of the existing social, economic and political forces of a specific moment in time.

Finally, it is not my objective to design a master plan that would satisfy the requirements of a particular city until the year 2000. I will take key urban areas of the city and develop a scheme that would deal with the spaces and the volumes that define them.

Before going any further into the issues of interest for this project, we must first establish some basic premises. They might have been expressed implicitly in the preceding discussion but here we want to make them explicit. First, some dealing with general issues such as:

- The recognition of the city as an artifact.
- The importance of historical precedent and cultural as well as urban continuity.
- The recognition of urban space as the primary organizing element of the urban morphology.
- The present physical solutions to growth and expansion differ from the traditional conceptions of space, place and architecture.
• The existing continuously built environment has great potential and possibilities of evolution.

• It would be to the benefit of the city and its people to understand the traditional urban form and to use its potentials in the present developments.

• Defined streets and squares are essential to the community.

Finally some specific premises regarding the city itself:

• The chosen city is growing.

• The expansions are mostly residential.

• The project will be based on present demographic figures, norms, and automobile requirements, creating assumptions when needed.

Three basic situation types can be described when dealing with the problems of urban morphology in the Latin American cities: one would be the expansions, the situation where the development occurs outside the limits of the traditional pattern, another would be the interventions, when the developments occur within the traditional city, and the third we can call the smoothing out of existing disparities, where the traditional context has degenerated in such a way that the fabric
is being eroded for whatever reasons.

I will be dealing mainly with the morphological problems confronted in the expansions trying to cover topics such as:

1. How can a reasonable continuum of the traditional patterns be kept while at the same time coping with modern needs? In other words, how can we try to create a continuous built environment that relates more to the old pattern and to people's memory?

2. What is the relationship of the fabric and its contents? What would the relationship of the housing type to the urban spaces and elements be?
   i. What are the requirements besides the internal needs of a family? Do they have to be able to define spaces? or create districts?
   ii. How can it be done?
   iii. Is it always the same relationship?

3. How can a new environment of continuous solids contain objects or buildings of a compositional nature?

4. Is a collage of the two models, continuously built and buildings in space, be done? Is it worthwhile? and under what principles can it be done?

5. How can we define edges and entrances within
a grid system?

6. How much grid pattern fabric is too much?

7. How can we best deal with growth and change? Is the modern spirit of total design kept while using a more traditional vocabulary of space as objects? In other words, are we going to continue to design everything from the urban elements to the unit types, or are we going to give some constant elements where variables can occur according to user's wants or needs?

8. Should there be typologies of urban norms depending on the location within the urban network? or, will there be only one type of power of control? For example, will the possible influence of the user on a facade be the same all over the urban space, or will this power of control when in a public space differ from the neighborhood street location?

These questions should give us a flavor of what the issues are and what we can look for in this project of an expanding city in Venezuela.
The city of Guacara like many others in Venezuela has a physical structure based on the traditional patterns of the Spanish colonial grid. It follows the norms of the traditional concepts of space as the positive element created by continuously built solids.

It is located in the northern central part of Venezuela in the state of Carabobo, between the mountains that border the sea to the north and the lake of Valencia to the south. Guacara is 13 km from Valencia, a city that has become a major growing industrial area favored by being near Puerto Cabello, a port 52 km away, and by having good connecting highways to it and Caracas. Because of Guacara's proximity to Valencia and the industrially zoned areas, it is presently confronting growth and the problems related to it.

To its north, Guacara has the Caracas-Valencia highway, something that can be but an attraction for new residential developments. At the same time, the old Caracas-Valencia road goes through Guacara and it is this road that gives access to the industrial areas to the east and west. This becomes another element that makes the small city of Guacara an excellent area for expansion. All of this is confirmed by the new develop-
ment to the west, across the Guacara River, that has been built over the recent years. This new development contains 1,379 living units for an expected population of 7,432 persons in an area of approximately 37 hectares. The projected density would be about 200 inhabitants per hectare. Still more, the town is expecting further developments to occur and is already experiencing changes within the old structure. A logical site for an expansion would be the one lying in the upper-eastern part of the city which contains approximately 30 hectares for new development. The need for housing is such, that probably this area might actually be already urbanized or with plans for it. Nevertheless it is an excellent site for the elaboration of a thesis proposal that would take more or less the same requirements that governed the existing new development on the west for the purpose of proposing an alternative of urban design in a similar context. We will talk more about the project for this area later.

It is important to mention what the present norms are that rule over the new expansions and how they are affecting their physical structure. If we look at the existing table for New Residential Developments and go through the Residential Function column of requirements, we realize that the higher the density the less
the percentage of land coverage allowable for this particular function. In other words, the norms are already prescribing buildings that would be disassociated from each other, high, a version of the buildings in the park. The spirit of modern city planning is prescribing the physical form of the city through the norms (zoning by-laws).

Table for New Residential Developments

<table>
<thead>
<tr>
<th>Density</th>
<th>Education</th>
<th>Recreation</th>
<th>Commercial</th>
<th>Social</th>
<th>Residential</th>
<th>Road Ways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross</td>
<td>Net</td>
<td>Pre-School</td>
<td>Elementary</td>
<td>High</td>
<td>Sports</td>
<td>Parks</td>
</tr>
<tr>
<td>m²/inh.</td>
<td>Inh/ha</td>
<td>m²/inh</td>
<td>m²/inh</td>
<td>m²/inh</td>
<td>m²/inh</td>
<td>m²/inh</td>
</tr>
<tr>
<td>---------</td>
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<tr>
<td>50</td>
<td>65</td>
<td>0.44</td>
<td>1.33</td>
<td>0.56</td>
<td>1.11</td>
<td>0.37</td>
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<tr>
<td>110</td>
<td>35</td>
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<td>1.23</td>
<td>0.84</td>
<td>1.11</td>
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<tr>
<td>150</td>
<td>265</td>
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<td>1.11</td>
<td>1.67</td>
<td>1.11</td>
<td>1.11</td>
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<td>200</td>
<td>415</td>
<td>2.46</td>
<td>1.23</td>
<td>2.32</td>
<td>1.11</td>
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<tr>
<td>250</td>
<td>590</td>
<td>3.07</td>
<td>1.23</td>
<td>2.78</td>
<td>1.11</td>
<td>1.85</td>
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<tr>
<td>300</td>
<td>829</td>
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<td>3.88</td>
<td>1.11</td>
<td>2.59</td>
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<tr>
<td>400</td>
<td>1,600</td>
<td>4.92</td>
<td>1.23</td>
<td>4.44</td>
<td>1.11</td>
<td>2.96</td>
</tr>
</tbody>
</table>

* Inhabitants
** Hectares

37
REQUIREMENTS

For the design of an alternative of an urban expansion, we will take the same requirements used for the new development to the west of Guacara and propose a scheme for the site to the North-east of the city. The gross density will be 200 inhabitants per hectare and we will use the requirements of the table for New Residential Developments for such density. The percentage of coverage, however, for residential buildings will not coincide with the established norm because, one of the main objectives of this proposal is to explore the alternative of a continuous built environment more related to the old pattern.

The alternative will also aim at a capacity of growth up to 300 to 350 inhabitants per hectare, impossible in new developments designed and built without concern for growth. The norm of car to family ratio is presently 2 to 3 and we will try to obtain one to one whenever possible.

Given 29 hectares as the size of the site, and the projected density is 200 inhabitants per hectare, with 5.4 persons/apartment, we have a requirement of 1,102 units for 5,800 persons. The following numbers are derived from the table of New Residential Developments:
<table>
<thead>
<tr>
<th>Area in m² According to %</th>
<th>Area in m² According to Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school</td>
<td>7.134</td>
</tr>
<tr>
<td>Elementary</td>
<td>6.438</td>
</tr>
<tr>
<td>High School</td>
<td>4.147</td>
</tr>
<tr>
<td>Sports</td>
<td>18,908</td>
</tr>
<tr>
<td>Parks</td>
<td>20,300</td>
</tr>
<tr>
<td>Commercial</td>
<td>4,640</td>
</tr>
<tr>
<td>Social</td>
<td>4,930</td>
</tr>
<tr>
<td>Residential</td>
<td>139,722</td>
</tr>
<tr>
<td>Roadways</td>
<td>83,636</td>
</tr>
</tbody>
</table>

These numbers will give us the requirements, but, we must bear in mind that the modern technique of distributing 'use-zones' over an area will not be used. The urban fabric should be capable of housing more than one function in a given location, and favorable conditions must be created for spontaneous land-use.

Having set our objectives and with these figures in mind, we can now propose an alternative and see which relevant issues emerge at the different levels of the design process.
AN ALTERNATIVE

PROPOSAL

The Urban Design Proposal is presented in a graphical form. It is important to say that the order of the documents have no relationship to the design process followed. They are presented in a hierarchical manner for the purpose of clarity.
REGIONAL LOCATION
PROPOSAL

H  high school
E  elementary
K  preschool
Sp  sports
C  commerica c.
S  social

URBAN SCHEME
CONSTANT ELEMENTS

INFILL

BASIC AGGREGATION

VARIATIONS OF BASIC AGGREGATION

60 x 60_m BLOCK
possible aggregation of constant elements

variations

subvariations

120 x 120 m BLOCK
F1. TOTAL DESIGN

F2. PARTIAL

F3. SEGMENTED

F4. NORMATIVE

50 FAÇADES: GIVEN TYPES and POSSIBLE INFILL
STAGE 3 & 4

TYPE 'A' UNIT DEVELOPMENT
TYPE A UNIT TRANSFORMATION
TYPE 'B' UNIT DEVELOPMENT
TYPE 'B' UNIT DEVELOPMENT
PROCESS

Having been involved in the construction of the new development west of Guacara for two years, I came to know the city, its qualities and its problems. I selected the site to the east for my design proposal because I recognized in it possible alternatives for expansion. More importantly I selected this site because it contained characteristics that were generic in nature. With this in mind I hoped that the solution which I proposed would be relevant to other situations. The generic characteristics which I identified are the following:

- confrontation of new urban expansion with existing traditional fabric. In the selected case the traditional fabric was to the West of the sites.

- proximity to a main vehicular artery and/or regional road. In this case there are both; a highway to the North and a regional access road to the south.

- boundary by or containment of a geographical feature such as a river or mountain. The condition of boundary is present to the East.

After selecting the site, the first phase of design
was to analyze the specific characteristics of the site relevant to the creation of an alternative. For example, a particular problem existed where the regional road met the local city roads. An additional problem for the site was generated by the blocks of the existing fabric. The dimensions and shape of the blocks was highly irregular, dependent upon the particular location.

The second phase was to develop a feel for urban scale design and the important issues at this level. Having previously completed studies of the traditional houses and blocks,¹ and being familiar with studies by other workers,² I was able to do realistic sketches regarding the position and dimension of the fabric and aggregation of blocks without knowing how each block was made.

Once I had completed several schemes and understood the design issues and possibilities at this level, I started working at the level of the dwelling unit and block: I depended upon the previous studies in identifying the elements of the traditional house and their relative positions (see Appendix ). I established basic dimensions after a study of parcelling and spatial patterns within dwellings. I found that there were lot variations from a minimum width of 4.5 meters

¹ Lugo Fernando. *The Spanish Colonial House in America, a Graphic Model*, Unpublished paper, Spring 1979, M.I.T. (See Appendix for an excerpt.)

to a maximum of 9 meters and a minimum depth of 13.50 meters to a maximum of 27 meters. In terms of the size of the blocks they went from 60 by 60 to 120 x 120 with many combinations in between but staying mainly in 60, 85 and 120 meter sides. The Spanish-colonial equivalent would be 70, 100 and 140 varas respectively, a unit approximately equal to .835 meters.

Besides their general dimensions, others more specific were looked at: Zaguan minimum and maximum widths of 1.20m and 2.00m, and minimum and maximum depths of 2.70m and 7.50m, etc.

Finally, based on this understanding, I developed two modern prototypes capable of defining public space, or of being negative space at the urban level, by creating a continuously built zone of two rooms deep and of housing different variations of the scheme given certain constant elements. These elements were the facade, the patios and the cores, which were given a relative position to each other and a flexible dimension in between, in order to achieve various staging and possibilities of growth. Both types were tried out and examples of their potentials were done, then, possible ways of agglomerating these units were studied in order to see what block types could be formed.
Due to the fact that the facade was one of the constant elements that would be built and that it is the element for both possible visible personal expression and public space definition, different ways of building and dealing with this particular problem were investigated. I ended up with four basic possibilities; one called Total Design, where all the facade is designed and built, a second one called Partial Design, where a constant part of the facade is designed and built and norms are established for additions in the remaining spaces, a third, Segment Design, where separate pieces are totally designed and the in-between could be infilled according to rules, and finally the Normative Design where only rules are given and each builds its own.

After doing this study I realized that no specific type would be used all over the urban environment, but it would depend on the location within the urban fabric. For example, if the facade had to define a very public and important space, the first option of total design could be used. On the other hand, if in a very local and less important neighborhood level, the fourth option could be used and so on. The second option of Partial Design appears to have the most potential and use, while the fourth has pitfalls, specially if it is done without
any architectural idea like the example given.

The block type possibilities were many and varied. The 60 by 60 block was practical because it could accommodate street parking up to a gross density of 350 inhabitants per hectare and it could be made up of different combinations of the two scheme types and at the same time have variations of its shape. But, the urban scheme was not going to be a simple aggregation of different block types, at the urban level we can find other requirements. Therefore, in order to decide what block types would be used and how they could be put together, I went back to the urban level design.

The urban scape is not created by simply repeating block types and streets. These would form the texture or fabric which is the basic scaffold for the composition of the city which would be able to hold or define other elements of a higher level such as: major spaces, set pieces, gardens, main boulevards, etc.

As you can see the process was not a linear one. I went back and forth between urban ideas, dwelling and dwelling groups possibilities and between the design of space and antispace, in order to arrive at the final alternative.
If positive space is any perceived created space, negative space is essentially the opposite: a solid, but a solid in a particular condition of configuration which is qualified in two ways. First, it must be shaped to define and form space externally and cannot appear as a detached object. Second, it must be empty, thereby containing space internally. In other words, if positive space is the void which is 'in-between' form, its opposite, negative space, is the void which is 'in-between' space. Negative space is the specific design of a physical solid to solely serve the formation of space, both inside and outside itself. It is a condition of multiple appearances, looking solid and being empty. 3

This scheme basically tries to continue the existing fabric coping with the change of angles of the streets. It tries to bring the geographical feature (the hill to the east) into the development, create a center, sub-centers, edges and contain special buildings which together would form a series of public spaces that could be perceived as individual pieces but, at the same time, as composite forms with multiple interpretations. All of these were combined with the fabric in such a way as to create areas small enough (5-7 blocks) that could become recognizable districts with its own subcenter.

45. Analysis of Turin's urban fabrics and events as they evolved through time.
TACTICS

Having completed the previous work, there are some morphological strategies for dealing with urban growth which could be applied. In order to talk about them we must first identify the urban elements that make up the city and their relationships. These elements and relationships comprise a system which can be used to describe the various morphological strategies.

First, we make the basic assumption that we will deal with an environment in which space, traditionally conceived with a specific form and shape, is the primary organizing element. Modern, free, continuous, uninterrupted and undefined space which is the antithesis of traditional space, will not predominate.

Second, we establish that we are dealing with the level of urban design where a larger scale is considered and whole areas of a city are explored.

Third, the elements that make up the urban form and which we can deal with at this level are identified and defined. These elements are the urban fabric and the urban event. 4
The fabric is the basic print-type of the city, it is the scaffold of the urban objects or events. It is made up by the repetition of blocks (negative space) and streets (positive space) forming an identifiable texture. This texture can vary in terms of the relationships of solid to void and its degree of regularity or irregularity. It can house all types of functions in the block, the negative space component and is where we will find most of the residential use.

The Urban Event is the contents of the city. The Events are the things contained by the fabric and at the same time they help to hold the fabric together. The urban event is related mainly to public community functions; it gives legibility to the environment and allows for variety and unpredictability in the fabric. It is composed of the main avenues, squares, identifiable public buildings, etc., it is the object in the urban environment, be it void or solid. The event can acquire the function of boundaries, landmark or place of interaction.

There are some clear relationships between the fabric and the events that can be identified.
First, together they make the urban environment.

Second, the urban event can match the underlying structure of the fabric, like a plaza made out of a missing block, or it can not.

In terms of location of the event in relationship to the fabric, the event can be contained, supported or on the edge.
Given these basic relationships, there are different tactics for dealing with each of the elements. For example if we select the fabric of a regular grid, the following are possible tactics for relating this fabric to the events.

- For example, we can differentiate the grid fabric by creating different relationships to the events. A road may or may not have a particular destination point, such as an important solid or void. Although actual dimensions of the streets remain the same, the grid and fabric can be differentiated because the relationships to the urban events vary (proximity, aim, axis, etc.). Each street acquires a different meaning. The grid fabric can also be differentiated by dissintergrating it in certain areas to form a new field, by changing facade types along different streets or by changing the widths of certain streets. In other words, differentiation results from the creation of small scale events within the grid.
The grid fabric can relate to geographical features in two basic manners: by being a completely independent system from the natural feature or by responding as a special condition, such as a facade.

Similarly, there are two basic manners for containing objects within the fabric: One of independence in which the grid remains separate from the object, or one of interplay in which the object does not match the underlying structure of the grid but a special condition is created to which grid fabric adapts.
We now return to the issue of the relationship of fabric to event. The grid, having an underlying structure of coordinates, has the potential of being a frame of reference for the urban events. The same way the free plan can accommodate the platonic solid, the grid fabric can contain the platonic void.

This characteristic is one of the great potentials of the grid fabric.

Finally, the grid can be open-ended and expanded or it can be terminated in a particular situation. Terminating the grid fabric can be achieved by creating a special condition which leaves no room for expansion. It can adapt to growth because of the predictability of its module in an open-ended condition. Its adaption to growth is reinforced by the unpredictability of the negative space or contents of the block. This continuum depends on space and not on solids. As
a result, different requirements can be accommodated inside the solid while maintaining continuous legibility of the urban space.

The previous discussion outlines some of the possible tactics for dealing with the relationship between events and the grid fabric. In addition, there are tactics for dealing with elements alone. Following are presented some basic ones:

- Events can be independent pieces found in the environment. They can act as local centers, landmarks, or as special places.
The urban event can be connected to form a larger structure. This can be achieved through perceptual lines, axis, or simply through the connections between different events.

Finally, multiple interpretation is a powerfull tactic that can be used when manipulating the urban event. A mono-idea scheme can be too rigid at times and incapable of change and variety. By overlapping ideas we can allow different interpretations and ambiguity to occur. As a result an environment with greater potential for a range of meanings can be created.

We see that the possibilities are many. Like modern literature, urban events should tell more than one story at the same time. Not only one fabric should prevail but rather a collage should be created to allow for a more dynamic urban prose. It is through ambiguity
and multiple interpretation that an environment will live through time through its capability of sustaining growth and change.
CONCLUSION

It is this writer's intention that the readers of this document establish their own views by evaluating the information which has been presented here. However, some basic conclusions can still be stated at this point.

A very fundamental one is the recognition that the morphological model of the modern city has problems that cannot be ignored. The use of this model in the expansions of traditional environments should not be continued.

We realize that the traditional city model has great potentials and that we can abstract basic notions from it, not to imitate the form but the ideas behind them. Through the implementation of these ideas an urban grammar can be created that can still cope with automobile densities, green areas, and F.A.R. requirements.

Further elaborations can be easily arrived at if we compare our particular proposal to the new develop-
ment on the west of Guacara. We find that both can conform to the existing norms of automobile to dwelling unit relationship of 2 to 3. The existing development concentrates the automobile in order to be near the concentrated dwellings, and as a result, a large part of the green area of this version of *City in the Park* becomes a parking lot. On the other hand, in the low-rise alternative for the same density the automobile is distributed through the streets. Instead of having few roads and large parking areas we exploit the potentials of the street to park the cars. In this manner the concentration of cars is avoided and a more pleasant distribution is achieved. Through this move the space for parking automobiles is also a means of circulation and an active area of the environment.

Another issue which becomes evident through the comparison is the great potential of the traditional model to cope with growth and change. The fact that the spaces are the objects of the environment allows a wide range of forms and uses to occur inside the solids which surround and define these spaces. They can change, grow, etc., while the important urban element remains. The modern city model can not do this, the pristine object is designed to be looked at and any change would immediately alter the concepts. This
particular issue has a more transcendental quality. Because of the ability of the traditional model to change, it can adapt to functional changes through time and an environment of mixed functions can result allowing for work opportunities to occur within the development. A direct result of this is the decreasing need for the automobile and the increasing qualities of the urban spaces. This is not possible in the modern city where zones of use are pre-established and the buildings are shaped to fit accordingly.

Finally, a very important issue which arises is through the comparison that has to do with F.A.R. and green space distribution. The modern city model, exemplified by the new built development, contains large public open areas that belong to everyone, or rather to no one, and no private outdoor space. In our proposal the public green area is less but the private area is much more. This is a healthier relationship because the public spaces acquire a valuable scale, meaning and demand while every dwelling has its own piece of private garden. This is something which would be very costly to achieve in the highrise building model.

The F.A.R. for the given density is the same (1 to 1), one is stacked up vertically with horizontal owner-
ship and the other is distributed horizontally with possible vertical ownership. The horizontal one has the potential of growth, exterior and interior space integration and establishing public to private realms. We can also achieve through this horizontal distribution of construction a better definition of the public spaces as traditionally conceived, something which has meaning for the present society.

After going through the process of designing an urban expansion we can say that the use of space concepts of the traditional city can generate an environment with new dimensions and interpretations, an environment capable of ambiguity and multiple interpretation. This is extremely difficult to achieve through the modern concepts of space and necessary to do in order to house a contemporary pluralistic society.
This appendix is an excerpt from a paper done in the Spring of 1979 and titled *The Spanish Colonial House in America, a Graphic Model*. The part presented deals with the analysis of the traditional house in Latin America and the elaboration of a conceptual model of this dwelling type; a study area which is basic for the understanding of the design proposal for this thesis.

Originally the road system and the subdivision of land in the colonial towns created a grid pattern with the resulting blocks divided into four pieces of land. In Figure 5 we can see an example of the typical layout of a city, in this case *La Ciudad de Santiago de Leon* today called Caracas. Many cities were done in the same manner, according to *The Laws of the Indies*, which were rules that governed the making of cities in the New World. The original subdivision of the block was in four lots (see Figure 6a) but it was too much land for one house. Eventually, demand took over and the original lots were further subdivided (see Figure 6b). As a result we can see two basic lot types: lots on the corner and lots in-between. Figure 7 shows an example of a block as it is presently found in Old San Juan, Puerto Rico. We can again see the different lot types and as a result, the different housing types. We can now continue to do further analysis at the dwelling unit level, focusing on the in-between lot type.

It is important to examine other examples of
Figure 5: Original layout of "La ciudad de Santiago de Leon" today called Caracas. (Gasparini, G. (1965))

Figure 6: Transformation of the lots from the original layout. (Gasparini, G. (1965))

Figure 7: Block study of historic zone in Old San Juan, P.R.

Figure 8: Schematic plans of colonial houses in Venezuela. (Gasparini, G. (1962))

House types which are found elsewhere (see Figures 8a, b, and c). The examples shown are also very traditional but it is important to note the differences between them.
In the first example (Fig. 8a) the court is completely surrounded by a gallery with rooms, in the second example (Figure 8b) one side of the court is defined by a gallery with no rooms and in the third example (Fig. 8c) a more complex system of patios exists. I will deal mainly with the first example and then see how the model can evolve in order to encompass the other two examples.

The last set of figures (9 through 15) shows some analysis of the data which abstracts essential notions for the development of the conceptual model. It is important to understand these because they represent the basic notions of the system. They might also imply a structure for the production rules.

Figure 9: The width of the site is always smaller than the length (ratio of 1 to 3, 1 to 2¼). Only one side faces the street and the other three are surrounded by walls. The entrance can only occur on the side facing the street.

Figure 10: Exterior spaces stand out as positive elements and begin to imply three main zones:
- Anterior Zone: street,
- Interior Zone: court,
- Posterior Zone: garden.
These become main elements of organization.

Figure 11: Looking at the grouping of rooms we again find the three main zones.

Figure 12: The structure also re-enforces the horizontal zoning and penetration occurs perpendicular to these.

Figure 13: The circulation pattern is very consistent. It always follows a sequence: street to zaguan (vestibule), zaguan to gallery/court, zaguan to almost any room. The zaguan becomes an important transition space between public and private, similar to an antichamber.

Figure 14: Position, access, ventilation, illumination, dimension and function re-enforce the three zones.
- a - near the street: direct illumination and ventilation, bigger rooms, can have direct access and function as an important semi-private space,
- b - in between rooms: no direct ventilation nor illumination, usually private rooms,
- c - adjacent to rear garden: direct ventilation and illumination, mainly service and can contain secondary vertical circulation.
Figure 15: Expansion occurs in the garden, usually with a perpendicular structure with respect to the rear wall. In some cases another horizontal set of rooms is added. The end result is another court surrounded by rooms.

With this series of analyses one can begin to formulate a conceptual model of the system and begin to see how the basic structure of the house will affect the Graphic Model.

4. Model:
Part 1: A conceptual model (verbal description) of the typical Spanish Colonial House in America.

A. Assumptions:
of order - 1. The model will first deal with two-dimensional (1 floor) house variations of the system, and will first include only the simplest cases (rectangular site).
2. The model will be subject to the limitations of the site.
3. The model will be based on some examples from Antigua, Guatemala (but not bound to this location) and personal knowledge of the system.

of model - 4. All spaces will be accessible, directly or indirectly, from the outside.
5. Under no conditions will there will be overlapping of spaces.

B. Identification of Elements:
1. Site.
2. Court (paved outside space).
5. Zaguan.
6. Service spaces:
a) kitchen, 
b) bathroom, 
c) storage room, 
d) laundry, 
e) coach room.
7. Serviced spaces:
a) Communal -
   i Reception room, 
   ii Dining room, 
   iii Family room, 
   iv Terrace, 
   v Balcony.
   b) Private -
      i Master bedroom, 
      ii Bedroom - one person 
         one + persons 
         iii Studio, 
      iv Business room.
8. Circulation space:
a) Halls, 
b) Stairs.

C. Relationship Between Elements:
a) Statement about the elements: there are parameters that have to be established in order to know the amount of elements that there can be at the same time.
1. There can only be one (1) site, where all the other elements will be located.
2. Only one main court, smaller courts are those that are transformed from the garden.
3. Up to one garden, serves for plants and/or extensions of the house.

4. One (1) Zaguan, transition space between outside street and inside gallery or court.
   (the function of the following is implicit)

5. One to two kitchens.

6. One to 3 bathrooms.

7. Up to one (1) storage room per serviced room.

8. Up to one (1) laundry room.

9. Up to one (1) coachroom.

10. Up to one (1) reception room.

11. Up to one dining room.

12. Up to one family room.

13. Up to one master bedroom.

14. Up to one studio.

15. Up to three bedrooms.

16. Up to two business rooms.

b) Statement About Their Relationships:

1. The site will be surrounded by walls on all sides except for the street, which is the only possible access. The site can be transformed into a court defined by a space which can be transformed into particular indoor elements that constitute the indoor area of the house. In addition to the above, the site can include a garden on the side of the lot opposite the side that faces the street.

2. The court will be surrounded by an inside transformable space and will communicate to this through a gallery. Thus, the gallery continues along all sides of the court.

3. The garden will always be at the rear part of the lot (which we identified in No. 1 as the side of the lot opposite the side that faces the street).* This element can be transformed into more inside spaces, small courts and/or small gardens.

   *It will be defined on three sides by the surrounding walls of the site and on one by the space that can be further transformed into inside spaces of the house.

4. The Zaguan will connect the street with the gallery that surrounds the court. It will be transformed by adding access to other rooms that will be adjacent to it. It will have a maximum of four doors.

NOTE: All of the above are the essential relationships when the inside spaces are all in one group, they are considered to be one element. But if we look at the elements in a more detailed way, the following relationships are found.

The transformable indoor space will be differentiated in three categories:

a) Adjacent to the street facade as - Front transformable indoor space.

b) Adjacent to garden or rear side - Back transformable indoor space.

c) That which remains in between - Side transformable indoor space.

5. The Front-transformable indoor space can be transformed into combinations of the following: business room, reception room, family room, dining room, balcony, and hall.
6. The Back-transformable indoor space can be transformed into combinations of the following: kitchen, bathroom, storage, laundry, coachroom, terrace, master bedroom, bedroom, studio, stair and hall.

7. The Side-transformable indoor space can be transformed into a combination of the following: bathroom, storageroom, family room, bedrooms, stair, and hall.

Further definition of possible combinations of functions might be needed, but the preceding is sufficient to permit the development of a set of production rules of the system at the level described. Dealing with this particular order of Architecture, it becomes difficult to define function because many spaces were simply seen as rooms and no specific use was assigned.

D. Special Cases:
According to the above description of the system, sectors and/or parts of the whole structure that do exist as variations would then be special cases. I already mentioned the corner situation as not being included in the model. The corner unit would be a special case with its own subspecial cases. However, the following are examples of special cases for in-between lots.

I will have to think about these and how they can be incorporated, since they form an essential part of possible variations that exist in the system.

Figure 16: Special cases of the in-between unit.

Figure 17: Real examples of special cases, Edo. Falcon, Coro, Venezuela.
An annotated bibliography dealing with the colonial urbanism in Latin America is of great importance for expediting future studies in this field. If there are not many studies dealing with the urban history of the colonial cities, there are even fewer that handle the theoretical and analytical aspects of it.

We may say that there are several differences between the historical point of view and the theoretical visions of a specific moment in history. While the first embraces the study of the factors which underlie the founding and evolution of cities and not simply being an exhaustive enumeration of facts or a compilation of maps, the latter should overstep the notion of time and give a suppositional and opinionated version of select facts creating abstractions that could be useful for present day problems. The perspective of urban history is now required to activate rather than inhibit the progress of urban creativity.

The purpose of this bibliography is to comment upon material that deals directly with the Colonial


Urbanism in Latin America, as well as to make a selection of present works of general theories of urban form that we believe are useful for studies in this field. The objective being to facilitate future studies in the theoretical area in such a way that Urbanism in colonial Latin America will transcend the barrier of historical information. The need is not only the expansion and deepening of studies in urban history but the creation and evolution of urban theory that relates to this topic as well.

One main source used for this compilation is an annotated bibliography on the Evolution of Cities in Latin America prepared by Jorge E. Hardoy and published in the Council of Planning Librarians, Exchange Bibliography #LA3, in September 1962. This work deals with materials on the historical background of the growth and planning of Latin American cities. It covers the Colonial cities as well as the cities of Pre-Columbian America and the period following independence: 1820-1940. Even though the document is old, valuable primary sources are found. We will limit our scope to the urbanism in the colonial cities, being a specific issue of one epoch, and will refer to Hardoy's work whenever applicable.

84 J. Hardoy, Jorge E. Opus Cit.
The present bibliography will be classified into five categories: (a) Map collections, (b) the legal documents that established regulations for planning colonial cities, (c) studies of the colonial urbanism in Latin America where the elements and origins of the cities are discussed, (d) studies of specific cities which show a more detail contextual version, and (e) a selection of general theories of urban form that we believe to be useful in relationship to our study area. This last category poses a problem due to the extensive amount of material devoted to this topic. Therefore, some selective criteria will be used in order to limit the amount and make it more valuable. It seems best to express the criteria as clearly as possible through the comments on the specific works.

It is important to mention that sources having to do with the accounts of travelers related to the colonial cities is not included in this bibliography because Hardoy's work has a complete documentation. You can refer to his work if interested in this particular area.
A. MAP COLLECTIONS


This book contains an excellent collection of plans for the colonial cities. It presents a variety of types regarding the different forms of these cities. In its introduction, Rojas, Montoya and Rexach, present a very good and elaborate criteria for classifying these different types according to form, geographical location, foundation time, purpose etc., and further subclassifications. However, when they present the plans they just simply list the qualities of each city but they are not grouped in any particular way nor are relationships elaborated upon. It would be interesting to take their criteria and see the possible implications regarding location, form etc.

It is worth mentioning that the color presentation of such drawings can be but of interest because of their amazing beauty and originality, particularly if you are like most of the readers and have always seen these documents printed in black and white only.


Braun, Georgius and Hegenberg, Franusuus. *Civitas Orbis Terrarum*, 1594.

Hardoy, Jorge E. *Plans of Indians and Colonial Latin American Cities* (two volumes).

The two volumes contain an excellent compilation of plans, perspectives and aerial views of the Indian and colonial cities in Latin America. The documents related to the colonial cities are divided into five groups: Mexican cities, Island cities, Brazil and Spanish American colonial cities. This can be seen as an attempt to use a criteria for subdividing the great amount of information that there is on this theme, nevertheless, there is no further development nor discussion. Apparently this book is a very rare document that could have been a prelude for a publication of a study on this area.

In the section of the colonial cities we find plans of four Spanish prototypes; Braviesca, Puente la Reina, Villareal and Almenara, but again no explanations are given.


A two-volume publication, the first with illustrations and the second one with brief descriptions, which is introduced by Fernando Chueca Goitia and Leopoldo Torres Balbas.

An Excellent compilation of maps of cities, most of which are dated from the 17th and 18th centuries. There are a few maps of plazas and minor urban elements. Almost all the main cities of the colony are reproduced. In the introduction the authors Chueca Goitia and Torres Balbas attempt a formal classification of Ibero-American cities. It is unfortunate that there are no mining cities, whose irregular designs are less known. On the other hand, there are too many examples of settlements of lesser importance which merged as a consequence of the colonizations begun in unpopulated territories during the 18th century.

* * comments on italics are taken from J.E. Hardoy's work *Bibliography on the Evolution of Cities in Latin America, Opus Cit.*


B. LEGAL DOCUMENTS


This article contains part of the original version (Archivo Nacional MS 3017, Bulas y Cedulas Para el Gobierno de las Indias) and its English translation of the Royal Ordinances concerning the laying out of New Towns issued by King Philip II (Reign, 1556-1598) from the Escorial in 1573. This was a detailed document concerning the layout, protection and form of the colonial towns in America that came as a revision of the original 'Laws of Indias' of 1523.

Of the 148 ordinances made, this article contains numbers 110 through 137 which is the group of norms that affects most directly the morphology of the city. They have to do with subjects such as: the position and form of the "Plaza Mayor," or main square, and of secondary plazas, the location of the church and government buildings, the relative position, dimension and shape of the streets and the residential buildings, etc.

Even though there are discrepancies as to how much these laws really influenced upon the colonial scene they can not but be of interest to those who observe and study the urban form of the Latin American cities.

Those norms having to do with the selection of the site for the city and its boundaries (Nos. 32-42) are not included in this article.


Two other editions of this extremely important compilation of laws issued under the auspices of the Spanish Crown were issued previously, in 1681 and 1759. After the third edition, others were made in 1791, 1841, 1889-1890 and 1943. The edition of 1774 was issued in four volumes. This massive compilation included nine books of 218 headings and 6,385 laws.

Of this comprehensive series only the seventh heading of the fourth book, "Of the Population of Cities, Villages and Towns" (36 laws in all) specifically discusses the subject of urban planning. Other parts of this book deal with the subject and especially heading number five, "Of Urban Agglomerations," heading six, "Of the Discoverers and Pacifiers," heading eight, "Of Cities and Villages and Their Primacy," and heading twelve, "Of the Sale, Composition and Distribution of Land, Lots and Water." Headings nine, ten and eleven of the fourth book deal with the problems of municipal government, and headings thirteen, fourteen and fifteen of the same book consider the economic resources of municipalities.

Thus all the legislation related to planning, design, government and financing or colonial cities is included in the eleven headings of the fourth book that we mention. These five sections, the fifth, sixth,
seventh, eighth and twelfth of the fourth book that are
directly related to city planning, include 78 laws.
Fifty-six of these are older, or are part of the
"Ordenanzas de descubrimiento y población," (Ordinances
Regarding Discovery and Population). Careful analysis
of the sections mentioned above is fundamental to an
understanding of colonial urban planning in Latin
America.

Paso y Troncoso, Francisco del. Papeles de Nueva
España for the Mexican Government, Madrid, 1905. Seven
Volumes.

Real Archivo De Indias, Colección de Documentos Inéditos
Relativos al Desaoubriamento, Conquista y Organización
de las Antiguas Posesiones Españolas de América y
Oceania. Madrid, Forty-two Volumes published between
1864 and 1884.

These extensive documents deal with a variety of
matters. Contained in Volume 31 are the Instruction
given to Diego Colón in 1509. In Volume 23 is included
the Instruction given to the three "friars Jeronimo" in
1518; in Volume 39, the Instruction given to Pedrarias
Davila in 1513 and one portion of a letter that the King
sent to this conquistador in 1514. All of these docu-
ments are antecedent to the urban legislation that came
to be in force some years later.

The reader who examines this collection with
patience will discover the multiplicity of problems
which Spain faced as a result of her conquest of America,
and the efforts made to maintain administrative and
judicial centralization thousands of miles from the
actual circumstances.

C. SPANISH URBANISM IN AMERICA

Angulo Íñiguez, Diego. Historia del Arte Hispano-

Geografía No. 11, Facultad De Filosofía, Ciencias E
Letras, University of Sao Paulo, 1956.

Benevolo, Leonardo. Diseño de La Ciudad-4, El Arte y
La Ciudad Moderna del Siglo XV al XVIII, Ediciones G.
e la Città Moderna dal XV al XVIII secolo. Spanish
version of Maria Dolores Traumunt.

Benevolo, Leonardo. Las Nuevas Ciudades Fundadas en el
Siglo XVI en America Latina. Una experiencia decisiva
para la historia de la cultura Arquitectónica del
"cinquecento", Boletín del Centro de Investigaciones
Históricas y Estéticas, 9, Facultad De Arq. Urb., U.C.V.
Caracas, Abril 1968.

Chueca, Goitia Fernando. El Metodo De Las Invariantes.
Boletín Del Centro De Investigaciones Históricas y
Estéticas, 9, Facultad De Arq. y Urb. U.C.V. Caracas,
Abril 1968.

Frontado, S. Guillermo. Las Leyes de Indias: Observa-
tions of its influence on the Structure of Physical
Space in the Latin American Cities. M.Arch.A.S., M.I.T.

Gasparini, Graziano. America, Barroco y Arquitectura.

Though it is mainly a study of the Barroque in
America, how it was interpreted and developed, in
Chapter Three: Clasicismo y Modernismo de la ciudad
colonial en America (p. 89), we find a good compila-
tion and argument of the historical factors that
influenced the development of the colonial cities in
The main objective of the chapter is to conclude that neither in Spain nor in America are there urban settlements that fall into the definition of Baroque cities. Nonetheless we find a good clarification of the terms Modern and Classical as they relate to the renaissance cities.

Another interesting point to note is that the historical data is backed up with very extensive and excellent graphical information.


Gabriel Guarda presents in this work an extraordinary and exhaustive study of the urbanization process of Chile under the Spanish Kingdom. He includes studies of less famous territories like Finis Terrae where still he finds authentic urban values that have caused some influences up to the present.

At the beginning of the book the author makes clear his point-of-view regarding what he considers to be the main sources of influence for the colonial urbanism. He attributes the origins strictly to Spanish sources like the theoretical formulations of Santo Tomas de Aquino, Eximenic, etc..., that were known at the time of the conquest. It is interesting to see how he elaborates his point-of-view, nevertheless, we must be aware of other emphasis given to other possible sources.

Guarda presents in one of the appendices all the plans and documents that one could possibly find for the given study area in a particular historical moment. He also puts emphasis, through his writings, to the theme of achieving the most with the minimum resources as a lesson for today's architects and urban designers.

It must be mentioned that this work contains a 4,648 book bibliography organized under 31 headings and one addenda. Of major interest are numbers one and ten, Generals and Urban Architecture.

Guerrero Moctezuma, Francisco. Las Plazas en las CIudades de la Nueva España, en Relacion con la Ordenanza de Nuevas Poblaciones de Felipe II, Mexico, 1934.


As it was stated in the introduction of this bibliography, Hardoy's annotated bibliography is one of the main sources used for making this compilation. His work deals with materials on the historical background of the growth and planning of Latin American cities. It covers the colonial cities as well as those of Pre-Columbian America and the period following independence: 1820 - 1940. Even though the document is from 1960, valuable primary sources are found.


This article and a previous contribution by the same author entitled "Colonial Towns of Spanish and Portuguese America," \textit{Journal of the American Society of Architectural Historians}, Vol. XIV, No. 4, December 1955, are among the few studies of urban history during the colonial epoch in Brazil. Both are too brief, but they emphasize the difference of criteria of the structures arising from Spanish colonization and that of the Portuguese. It is clear that the divergent experiences of the two countries were reflected in the cities founded in Portuguese and Hispanic America.


Based on the author's recent field study of Spanish cities, from the viewpoint of their influence on Latin American urban form, this article discusses the impact of Roman colonization, and of later Moslem domination which changed the symmetry and public orientation of cities into labyrinths of winding streets and urban elements emphasizing privacy. The greatest influence across the Atlantic, however, was that of the 16th century cities of Imperial Spain administered with skill, laid out on regular lines, the cathedral and the ayuntamiento or city hall, together dominating the main
It is an important work because it develops the history of the aesthetics of the void, using the plaza as the representative element. It is also important because it treats the urban space not as a by-product but rather as the dimensional void which has to be thought of. This happens to be a primary issue when dealing with the studies of colonial Latin American cities.

Unfortunately it devotes only five pages to the issue of Spain in the "new world." Nevertheless, interesting points of view are given with respect to the origins of the shape of the plaza and its function in the community life.

D. STUDIES OF SPECIFIC CITIES


Bromley, Juan and Jose Barbagelata. Evolucion Urbana de la Ciudad de Lima. Lima, Consejo Provincial, 1940.


Munizaga, G. Notas Para un Estudio Comparativo de la Trama Urbana. School of Architecture, Catholic University, 1977.


The first volume is especially valuable, particularly Chapter 2, "The Form of the Colonial City," a subject already dealt with by Palm in his article, "The Origins of Imperial Urbanism in America," Pan-American Institute of History and Geography, Mexico, 1951.

There is a detailed analysis of the original urban
settlement on the island of Santo Domingo, and the attempts of the author to discover the original urban plan of the "lost city" of Isabela, the first community on Santo Domingo, and to explain the origin of the grid pattern in America are intriguing.


This study and proposal deals with the intervention within the traditional pattern in the center of the city of Santiago in Chile, where the qualities of the old are recognized. The goal of the proposal is not of historical preservation (cosmetic) nor of destruction for renewal (surgical) but of understanding the demands of densification and other requirements within the old pattern and cope with them by creating an urban grammar capable of maintaining the positive characteristics of the existing environment, reviving old ones and creating new ones.

It is interesting to say that the proposal excludes the traditional way of singling out specific activities and distributing them in 'zones' through the map. It does not want to control or predict land-use patterns (a la planning) but rather to create favorable conditions where spontaneous land use occurs. Also, instead of dealing with density in persons per hectare it uses construction per area which has important and different implications.

This material also contains an analysis of the background of the urban grid where the context is given the important dimension of the past.


Toussaint, Manuel. Patacwaro, Instituto de Investigaciones Estéticas, México, University of Mexico, 1942.


E. THEORIES OF URBAN FORM


It is an excellent compendium of studies that examine streets as spatial structures. It analyzes man's intervention in the physical environment and his place in the street where transactions occur. The work also discusses the street as a city model and presents notation systems for analyzing them. We find historical, anthropological, social and cultural perspectives of streets and finally specific application of the issues identified or proposed.

Anderson's fundamental theories of thresholds are found in Chapters 1 and 14. The ecological view of his approach is presented in Chapter 1: People in the Physical Environment: The Urban Ecology of Streets and in Chapter 14, Studies toward an Ecological Model of the Urban Environment, he presents a model for analyzing the environment and possible techniques to be used.


- Gohried Bohm
- Charles Moore
- Vittorio Gregotti
- Alison Smithson
- Oswald Mathias Ungers.

Guidoni, Enrico. *Street and Block - From the Late Middle Ages to the Eighteenth Century*, *Lotus International*, 19, pp. 4-19, June 1978.


It is basically a handbook for professionals or students who wish to understand or apply the supports method which deals primarily with the dwelling level. A support involves those decisions over which the community has control, within it, the individual decides and acts. An extensive theoretical background is found in:* Supports: The Systematic Design of Supports.*

It is important to mention that a direct application of these methods cannot be done in Latin America because we are dealing with the Patio House Scheme and the method of support is based on a simple, two-side exposed, rowhouse. Nevertheless an attempt could be made to adapt it and see its possibilities.


A valuable document where the traditional meaning of urban space is brought back into currency. As Colin Rowe writes in the Introduction, referring to the book: *It is an evident critique of 'planning', highway engineering, the urbanistic proposition of CIAM, of science fiction cities, populist do it yourself and townscape,..."*

It contains an extensive classification of urban spaces and a good world-wide documentation of the erosion of urban space in 20th century town planning. The destruction of the traditional pattern of Stuttgart...
is an important theme in this book that we can easily compare to the destructions of the Latin American traditional cities. It not only shows the Stuttgart that was and the 'what happened to it' but suggests through his proposals the materialization of his theories.

One must be well aware of what notions of the traditional themes are brought back and what residues of 'Modern Architecture' are left, i.e.: total design. Interestingly enough the best constructive criticism of this book is found in its Introduction written by Colin Rowe which is a great asset to this publication.


This book is the basis for understanding Lynch's theory and where the five elements for analysis and description of the environment are carefully explained. Lynch's main interest in this work was to study the role of environmental images in our urban lives.

His analysis, done through user assessments, would make us more sensitive to how people perceive the environment. Nevertheless, it's time consuming and does not often appeal to the non-academic world. Maybe theories of perception, like the Gestalt, should first be studied to understand, as professionals, the perceptual views. In the new urban expansions the users are not known therefore, making assessment a hard matter and only speculative if done in already existing new developments.


See also: Peterson, S. *Urban Design Tactics*, Ibid. 76-81.


