FORMAL INTERVENTION IN THE URBAN LANDSCAPE:
Designing a Culturally-responsive Framework for Housing in Mexico City

by

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Submitted to the Department of Architecture in partial fulfillment of the requirements for the degree of Master of Architecture at the Massachusetts Institute of Technology.

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Thesis Abstract.

This thesis explores an alternate approach to designing affordable housing. Housing is presented not just as physical shelter but as part of a larger socio-economic and cultural context. Implicit in this thesis is the belief that who builds is just as important as what is built. When people are involved in the act of building their homes and their living environment, whether directly or indirectly, a richer and healthier urban environment will result.

There are two main parts to this thesis. The first is an exploration into the urban context of Mexico City and an analysis of dwelling transformations in a low-income neighborhood. The attempt is to observe and understand the patterns of dwelling transformation as clues to successful and culturally-appropriate housing.

The analysis serves a base of understanding and informs the second part of the thesis. The second part explores and proposes of a physical support framework for a specific site. The framework is meant to allow the user over time to build incrementally using the design "clues" as a reference. The built framework is a formal manifestation of different levels of control by the designer corresponding to the opportunities and specific circumstances which the site presents. Also proposed are design interventions in which architects can have more control such as the design of a neighborhood church, a commercial-residential complex and a design intervention in the street.

THESIS SUPERVISOR

Jan Wampler
Associate Professor of Architecture
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INTRODUCTION

Architects do not have a very good track record of providing good housing for the community, particularly to those that lack resources to rent or purchase houses. There has been much written about the failure of public housing projects in both developed and developing countries. Public housing projects tend to lack the individual identity, complexity and richness that traditional housing offers.

John Habraken in his book on Supports argues that individual identity and variations on a theme can be developed within a built framework which can be executed as a single design intervention. He advocates the involvement of the user of dwellings to have control in designing and constructing the infill within a three-dimensional support framework. In other words, variety and complexity in housing can still be achieved within a fixed framework provided by the designer. Along a similar but not identical vein Nabeel Hamdi in the Adelaide Road Housing project sponsored by the Greater London Council was one of the pioneers in allowing for user participation in low/middle-income housing. Inherent in his design proposal was a framework which allowed for multiple variations and configurations of apartments of different sizes corresponding to the different needs of the users.

There has also been work done in developing countries implementing "core-houses" which provide basic facilities such as bathrooms, sewerage and leave the rest of the task of building to the
future users. This approach has not had much success and is not encouraged in Mexico because it is seen to encourage rural-urban migration. Jorge Andrade has provided valuable information on dwelling transformations over a period of over 25 years in a neighborhood in Mexico City. Through careful documentation of not only formal transformations but the relationship between territory and social group organizations as well as territory-activity (use) certain patterns emerge that enable us to understand the process of dwelling growth.

The basic idea and thread of continuity that this thesis explores is quite evident. There is no feasible way in which low-cost housing with fully-equipped with services can be within reach of the urban poor. The urban poor in Mexico begin with nothing. Having practically no financial resources to begin with, they live through a rather ingenious method of recycling what the more affluent population disposes of. The task is to provide a physical framework which can serve as a reference to the user and guide the process of incremental dwelling growth while responding to the needs and the resources of the inhabitants.
'........there is a great deal of energy available to bring buildings alive by inhabiting them; that it exists in the hands (and hearts) of people who might do the inhabiting in far greater portion than it exists in the hands of architects (though there have to be architects of some sort to give shape to buildings); that inhabiting is an act which has been so often frustrated that it requires all the assistance we can give it, but is altogether worth the trouble, since buildings which are capable of absorbing human energy in great enough amount are able to pay back the inhabitants, with interest.'

Charles Moore.
An introduction to low-cost housing typology in Mexico City.

There are five main kinds of housing types in Mexico City.

1. Colonias Populares
2. Walk-up apartments
3. Vecindades (tenement court houses)
4. High rise apartments.
5. Squatter/ shanty settlements.

The most widely found form of housing is the *colonia popular*. The colonia popular or row houses in Mexico has a unique history. Currently it comprises more than fifty percent of urban land in Mexico City. It has as a precedent the predominant type of house form from the nineteenth century used by low income industrial laborers. Row houses are normally aligned in narrow lots and are one to two stories in height. This allows for moderate density of dwelling. The colonia popular in Mexico has three main origins of land development. The first is private speculative progressive development. This means that often a landlord purchased a piece of land and built apartments for rent or combined inhabitation. Often the process of construction took several years and the apartments built incrementally. Another kind of colonia popular is that which has been development by the public sector as a single design intervention. These dwellings also transformed over a period of time depending on the needs and resources of the dwellers. In most cases the dwellers were the land owners. A final kind of colonia popular is that
which has been formed through the invasion of government unoccupied lands. These begin as squatter settlements and after securing tenure rights, the dwellers start to build incrementally. The case study of the dwellings in this thesis is from this third category.

The oldest form of housing is found in the *vecindad* or landlord tenement. Many of these dwellings were converted mansions from colonial Mexico under the Spanish rule. In most of these cases dwellers shared common patios, and services. The outdoor semi-public space is used for a variety of activities as well as for ventilation and light. Some vecindades which were constructed after Spanish rule were by landlords who wanted to provide cheap housing, often of poor physical and unsanitary condition. Many of these tenements were destroyed by the great earthquake of September 1985.

Shanty or squatter settlements is another type of housing found in Mexico City. This model was developed in Mexico by the private sector as an alternative for housing new migrants, because of scarcity of rental accommodation in the city center. Often the private developer gained large profits with minimum costs of production or maintenance of the dwellings. This type of housing is accessible to low and very low income groups. Physically this kind of housing is an informal organization of shanties clustered in courts. In squatter settlements services are often shared and tapped off illegally from neighboring areas. Occasionally this type of housing transformed into colonias proletarias through a process of upgrading over time.
A fourth kind of low/middle income housing type is the walk-up apartment. This type of dwelling allows for medium to high density inhabitation although open space is uneconomically utilized. Normally groups of two to four apartments per floor are accessible through a common stair. The buildings normally range from three to five stories. This type of housing has its origins in Europe and the USA which was the model for low-income housing. Ironically, in its importation to Mexico, walk-up apartments have catered to middle and high income user groups. This has primarily been a result of the high construction costs which occur and the instant mode of construction.

Another form of housing is the high-rise apartment block. Also an imported model to Mexico, very high investment and utilities (particularly elevators) render this house type accessible only to middle and high income groups. Administration and maintenance of this house form is a burden to the city. Like walk-up apartments the utilization of outdoor space is extremely poor. High rise apartments vary in height from 5 floors to over 20 floors. This model should not be encouraged for low income housing under any circumstances and is detrimental to community life. It also fosters crime and unsafe living environments.
Figure 1.3 The Federal district- Metropolitan Mexico City.
A brief history of the urban context

The neighborhood which serves as the focus for study in this analysis is located on the northern part of Mexico City or also known as the Distrito Federal (The Federal District). The D. F. consists of several different delegaciones or city subdivisions. La Pastora is located within the delegacion Gustavo A. Madero which is the largest most populated subdivision in the D.F. Each subdivision is further divided into colonias or neighborhoods. In this way the enormous size of Mexico City has a hierarchy of organizations which have a certain autonomy and allow the city to function at a surprisingly efficient level. In terms of scale, the colonia or neighborhood is the smallest distinguishable unity for collective urban identity apart from the actual street on which one lives. For example, a resident would say that he belonged or lived in a certain colonia in much the same way that one would say that he lived in Brooklyn, New York or Cambridge, Massachusetts. The size of the average neighborhood is not as arbitrary as one would imagine, considering the uncontrolled urban growth which Mexico City has experienced in the past several decades. Each neighborhood normally has a main commercial, religious and social center. As such most neighborhoods are self-sufficient urban mechanisms which provide the basic services and activities which support urban living. These include areas for commerce, religious worship, social activity, recreation and sports and education.
Figure 1.4 Location of La Pastora.
The autonomy of the colonia has undoubtedly contributed to the success of Mexico City as a model for urban development. Each colonia gives the residents a sense of place and collective identity without which it would be easy to feel lost in the overwhelmingly huge metropolitan Mexico City which houses more than 20 million inhabitants. (1988) Consequently, many residents of such neighborhoods are raised, educated, marry and demise within the boundaries of their neighborhoods without having experienced much of the world outside. As such, the colonia remains the basic unit of the urban fabric which is the link between the inhabitant and the rest of the city.

Other socio-economic factors, however, have resulted in many neighborhood residents having to travel beyond their neighborhood boundaries to obtain employment. Such employment opportunities may exist in the old historic and commercial core of the colonial Mexico City or may exist on the periphery of the city where most of the industry is located. The presence of a highly efficient, modern and clean rapid transit system called the Metro is indispensable in helping to transport the masses to their place of work and back. Nevertheless, there still remains a significantly large portion of Mexico City which is not serviced by the Metro. Other public transportation facilities exist such as public buses, taxis and collective "mini-buses" (Peseros).

In terms of its physical and spatial organization, the colonias often take the form of a modified "Law of Indies" plan which Spain imposed on all of its colonies. Under this plan, the church and the plaza were at the
Habitacional hasta 50 hab/ha. (Lote tipo 1000 m²)
Habitacional hasta 100 hab/ha. (Lote tipo 500 m²)
Habitacional hasta 200 hab/ha. (Lote tipo 250 m²)
Habitacional hasta 400 hab/ha. (Lote tipo 125 m²)
Habitacional hasta 800 hab/ha. (Lote tipo plurifamiliar)
Habitacional hasta 200 hab/ha. / servicios
Habitacional hasta 400 hab/ha. / servicios
Habitacional hasta 200 hab/ha. / industria mezclada
Habitacional hasta 400 hab/ha. / industria mezclada
Habitacional hasta 200 hab/ha. / industria mezclada / servicios
Habitacional hasta 400 hab/ha. / industria mezclada / servicios

**Figure 1.5** Land use in vicinity.
focal point of the city with a uniform urban grid of streets and orthogonal lot sizes for residential construction. While this urban order is most clearly perceived in the older historic neighborhoods of Mexico City such as in the downtown area, it is not as clearly apparent in the newer neighborhoods. Obviously contemporary Mexico City has grown and developed under a different set of constraints, impulses and influences. While this thesis does not attempt to go into a detailed analysis of the organization of the colonias in Mexico City, suffice it to say that at least within the colonias populares there has been an attempt to maintain a certain consistency in terms of street layout and lot dimensions. For example one such recurring lot size is the 10 by 25 meter lot size. Another is the 18 by 7 meter lot. These correspond to lot areas of 500 and 250 square meters respectively.
Figure 1.6 A first glimpse of the Site.
A brief history of the neighborhood: La Pastora

As mentioned earlier, La Pastora was formed as a result of rural-urban migration and the occupation of public land by squatter settlements. According to local sources, the first inhabitants appeared on the rocky and cactus covered slope of Mount Chiquihuite (cerro del Chiquihuite) in the early 1960's. Together with concurrent economic and industrial expansion in the northern part of the city, the early dwellers staked out vacant land that could possibly become the site for their home.

It is not entirely clear who the land belonged to at that point in time. It is generally agreed upon that it was government land. Nevertheless, it was being sold to the dwellers by certain persons who claimed as having authority to distribute it. This land was possibly "ejidal" land earlier or land confiscated by the local government from wealthy colonial landlords. These early settlers and the other masses that would continue to stream in over a process of 25 years were called paracaidistas. Literally "Parachuters" because of the way in which they seemed to appear all of a sudden out of the sky.

Within several years, as tenure rights were secured for the land that they were occupying, the city proposed a subdivision of the land and a proposed street network. Basically an urban grid was imposed over the steep slopes of Mount Chiquihuite without much concern for the landscape. There was no attempt to provide a street plan that would be more sympathetic towards the existing hillside. At this point in time, there
there were no basic services available such as electricity, water or sewer disposal.

The early dwellings were shanties constructed from whatever remnants of building material the inhabitants could find in the area. Cardboard walls, stones and asbestos sheets were combined to provide minimum shelter for these early dwellers who had no economic resources to spend on building. All the income they received went into providing their food for the day. These shacks began as sporadic built interventions on the rugged hillside. Today 28 years later, La Pastora has a distinctly urban quality. The streets are well defined, although not all are completely paved. Most dwellings are now of permanent building materials with concrete building frames and brick infill. Asbestos sheets are still often employed as a roofing material. The streetscape is a collage of houses which are in various stages of construction. Some are building a second floor while some barely have a first floor constructed. But there are also squatter-like dwellings concealed behind the solid facades.

The past 28 years of living and building have not come easy to the residents of La Pastora. Only ten years ago, the neighborhood did not have its own electricity supply. Until then, electricity was illegally tapped from adjacent neighborhoods (a common phenomenon in squatter settlements in developing countries). Only eight years ago, a sewer disposal system was installed and five years ago water was openly available. Until then water was purchased from water trucks that drove
through the main street in La Pastora regularly. Even now, however, the supply of water is sporadic and occurs only during certain hours of the day, and the houses at the top of the hill have a hard time getting water at all hours of the day.

In the earlier days, residents of La Pastora used to dread the summer rains. The streets and the entire landscape used to be converted into raging mud slides from the clay-like subsoil. The absence of retaining walls and the barren landscape stripped of its original cover encouraged landslides and soil erosion. One family tells of the time when their cardboard shack was literally swept away by the mud and water. Today most of La Pastora's streets are paved although not with regular tarmac. Instead they are covered with cut stone found from the same mountain. Streets farther up the slope are still predominantly unpaved.

The main agents of physical change in La Pastora have been the residents themselves. Working within a context where the local city government has been unable to keep up with the exponential growth of the inhabitants of Mexico City, the local residents of La Pastora organized themselves into work groups and task forces. Together, they have been responsible for the paving of the streets, from the hauling of the stone to its cutting and placement as street paving. Likewise the sidewalks have been constructed and surfaced by local residents. Occasionally a tree planted on the sidewalk illustrates the personal initiative taken to make La Pastora more livable.
Figure 2.1 Aerial view of neighborhood.
The more influence a person is able to exert on his surroundings, the more committed he becomes. One becomes attached to things only when one is able to relate to them, when so much of one's own effort and feeling has gone into them that they become one's own, incorporated into one's own world of experience.

Herman Hertzberger.

The neighborhood.

A large proportion of the urban fabric which makes up la Pastora is used for residential purposes. The neighborhood lacks a larger communal or social center such as a plaza, market or park, which was common to Colonial Spanish towns and even other neighborhoods in Mexico City. There is, however, a church constructed at the intersection of one of the major commercial streets. Nevertheless, it appears to have been an afterthought and prescriptive to the religious needs of the community rather than being the generator of the urban form.

The main street which provides commercial activity for the neighborhood and is also accessible to vehicles is Calle Moctezuma. This street runs along almost the entire neighborhood at the foot of the hill. Even so, its commercial nature is piecemeal and the result of the additive process of built form. On the southwestern end of Calle Moctezuma there is a large public transportation bus yard. This is a large design intervention but does not contribute anything to the neighborhood apart from minimal employment. Instead, it provides extreme discontinuity of use, built form and public access given that it runs along a significant portion of the main street. The public schools in the neighborhood are relatively recent design interventions and still are insufficient to meet the educational needs of the neighborhood.
Figure 2.2 Site Plan.
The major cross street which intersects the commercial street at the base of the hill and leads up the hill is Calle Acamapixtli. Incidentally but not unintentionally, the main church is located at this intersection. This cross street is not accessible to automobiles beyond Calle Moctezuma. It is slightly wider than the normal 10 meter street with. There are small terraces which take on the role of the large plaza and this street becomes the stage for the parade for the Virgin of Guadalupe in the month of December every year. Multi-colored banners are strung across the streets and plazas as Mexicans in traditional Indian costumes parade from different religious centers throughout the city to the Shrine of the Virgin of Guadalupe several miles away but within the same delegacion or district.

The difficult terrain and the incline of the cross streets makes for limited vehicular access throughout La Pastora. Quite sensibly the major vehicular streets run laterally, such as the main commercial street Calle Moctezuma. The street under analysis is a cross street, Calle Acacitle. At the lower portion of the street towards the intersection with the commercial street, vehicular access is possible, up to three or four houses up the street. Beyond this automobile access becomes impossible. This results in fewer houses having garage doors which open out to the street as is often found in other neighborhoods. But because a smaller percentage of the population has sufficient economic resources to own cars, parking is not as much of a problem as it could be. One way in which residents address this issue is through renting a space.
Figure 2.3 Figure - Ground of site plan.
in a relative or friends house which has vehicular access. Nevertheless, it is conceivable that as residents gain in monetary resources and purchase cars, parking could become more of a problem.

The colonias proletarias are tremendous resources for study, research and documentation of the process in which urban fabric is generated. Because they are not the result of a single design intervention by higher authorities such as architects and planners, they reveal a level of richness and complexity not found in public housing and government built low/middle income housing projects. The latter are often monotonous and lifeless buildings because they lack the individual identity and the imprint of the dweller who participates in building his home. As John Habraken has pointed out in his book on Supports dwellers of public housing projects are "housed" rather than house themselves.

A note on the division of the lots in La Pastora and their dimension. The 10 by 25 meter dimension is extremely generous considering the scarcity of buildable land in metropolitan Mexico City. Analysis reveals that in several cases these lots have been subdivided into smaller lots. It was also noted that the lot was divided asymmetrically and were not of the same size. They also tended to be divided along the width of the lot, that is dividing the long rectangular lot into two smaller more square like lots. Often the lot in the rear was smaller in dimension to the lot facing the street. In one of the case studies, there was a separate entrance from the street leading to the lot in the rear. There was
Figure 2.4 Urban fabric in Old San Juan, Puerto Rico. Studies by Andrés Mignucci. Note combination of two lots at street corner.

Figure 2.5 Stages of Dwelling transformations. Private vs shared spaces. Study by Jorge Andrade.
no indication of two nominal lots being combined to form a larger lot size. This does not preclude the possibility of such a phenomenon occurring especially in the lots facing the lateral streets which have vehicular access. Such lots, in my opinion are more like to take on activities, such as commerce, which other lots do not normally. Given the passing of time, it is conceivable that they may combine to support other functions such as automobile repair. One must bear in mind that La Pastora is still relatively young as a neighborhood when compared to other neighborhoods in Mexico City and in Colonial Spanish settlements.

In fact studies done of Spanish Colonial towns such as old San Juan in Puerto Rico by Andrés Mignucci suggest that lot boundaries and divisions may change and continue to change over a longer period of time. This serves to confirm the theory of city form which sees urban fabric as a dynamic organism which is constantly in a state of flux and transformation as a result of human powers which act on it. Jorge Andrade has described dwelling transformation using a biological analogy of mitosis or cell reproduction. He describes the four main phases of Prophase, Metaphase, Anaphase and Telophase as corresponding to the levels in which private territories share communal territories such as kitchen, bathroom, patio and access. Other studies done on a variety of urban dwelling environments in Mexico City by Jan Bazant confirm the dynamic nature and transformation of residential dwellings and lot divisions which support other activity besides housing.
The socio-economic context.

The success of traditional self-built urban environments lie in their capacity to accommodate other uses such as retail, commercial or social uses. Often sundry food stores occupy the front portion of a house to cater to the needs of the community. *Tortillerias* or stores manufacturing *tortillas* which is the staple food of Mexicans are started by local residents to meet the dietary needs of the neighborhood. Likewise, pharmacies, restaurants, dental clinics, doctors, and barber-shops are often family based and are small-scale in nature and are an integral part of the urban fabric. Although present in some other larger, more established neighborhoods, there is no special shopping center in La Pastora.

The presence of these small-scale sundry business are all responses to make the neighborhood as autonomous and self sufficient as possible. There is sufficient commercial activity to meet the needs of the average resident of the neighborhood; if we could assume one existed. Weekly open air markets or *tianguis* provide for a somewhat larger selection of goods and services to the community. In these, small vendors set up their open air booths of culinary or consumer delights under bright pink plastic roofs that stretch across an the entire length of certain streets. these temporary structures are removed at the day's end and reappear the following weeks. Other locations for the purchase of food are specially constructed government-subsidized small food stores such as CONASUPO. These stores, or rather mini-supermarkets provide
basic food products such as beans, rice and eggs at government-regulated prices.

In terms of the religious life of the neighborhood, the local Catholic church provides the site for religious gathering for the predominantly Catholic population of the neighborhood. This church was built shortly after the street grid was laid out. The Catholic church has tried to maintain its commitment to establishing its presence as soon as possible in the newly formed neighborhoods that spring up in the entire metropolitan Mexico City. Like the dwellings in La Pastora, the church building itself is in the process of transformation and physical change. Currently it lacks permanent enclosure such as windows and doors. Part of the problem has been the complexity of the curved Candela-like roof form of the main sanctuary which is difficult to connect to.

Despite the Roman Catholic majority of Mexicans and residents of this neighborhood, there has been in recent years growth of Protestant evangelical churches in all of Mexico City. This neighborhood is no exception. In terms of and urban public presence, these churches are harder to identify because they are normally converted houses or are part of the urban fabric. They tend to be smaller structures than the Catholic churches and more humble buildings due to the limited
Figure 2.7 Main Catholic church looking east up Calle Acamapixtli. Note lack of street paving.

Figure 2.8 The local playing field.
financial resources of its members. Often such churches have an attendance of 30 to 50 members and meet in an informal atmosphere. As these churches grow, there is often a need for a more formal and larger structure to gather in. In many colonias populares, larger churches are still incorporated into the street streetscape and urban fabric and do not have much of a public formal presence. They are normally walled-off to the street and the main doors are open only on days of worship.

Other kinds of communal activity in La Pastora occur in a community center where residents meet to discuss the needs of their neighborhood such as the need for more infrastructure or garbage collection. But for the most part the residential street is the stage for a myriad of communal activities, conversations, soccer games and forbidden meetings of teenage lovers. Children abound on the streets of La Pastora and are often seen playing football (soccer) with anything that resembles a soccer ball. The nearby playing field is also almost always occupied by neighborhood soccer teams aggressively pursuing the game of soccer over barren soil. The cross streets in La Pastora which run up the hill are more difficult to imbibe with urban activity due to the difficult terrain and steep slope.
There is still a great need for buildings which serve educational purposes. In the early days, there was no formal structure for any level of schooling. Within the first several years of the neighborhoods formation, a large house was used for primary education. Later they built a primary school of the main street, Calle Moctezuma. Within the last five years they have built another school for secondary students. Nevertheless, there does not exist a preparatory school which prepares students for university education. One result of this is a large percentage of high school drop outs and youth roaming the streets and being involved in undesirable activities such as crime, drugs and alcoholism.

Figure 2.9 The main stair built by residents of the street.
The Street: Calle Acacitie.

According to residents who live on this street, this street was one of the first streets to be paved in the neighborhood. As mentioned earlier the city did not have any part in the process of paving the street or in making it more inhabitable. All the city did was lay out the street pattern and lots sizes. Later on services were installed. Through a long and arduous process, residents grouped together and through the help of those knowledgeable of building constructed, excavated and paved the street. They also built the retaining walls on the eastern end of the street forming three little plazas. All the building materials were obtained from the same hill such as the volcanic rock. Till date certain portions of the sidewalk are not yet paved due to the lack of cooperation of certain residents. Analysis of the site reveals already the attempt and effort to soften the essentially hard and harsh surfaces of the street and dwellings. Trees have been planted on the sidewalk by several houses and add visual interest and rhythm to the streetscape besides providing shade and being a place where human interaction can occur.

The existing stair on the hillside end of the street also was the result of communal work and design intervention. According to one of the chief builders the location and orientation of this large stair was due largely as a response to the landscape and ground conditions. Early contour drawings and current site analysis indicates that the ground on the southern side of the street is at a higher elevation than those on the northern side. As such, this condition determined the placement of the
stair on the southern side of the street connecting the stair to the plazas at the top of the street. This design response also maintained a minimum of cut and fill of the prior landscape.

The extremely difficult terrain has been rather ingeniously tamed and made habitable and accessible over a period of time through the hard work and dedication of the residents of the street. The process of excavation and construction of retaining walls, especially on those on the hill-ward side was no simple task. Fortunately, to the advantage of the residents, the large proportion of volcanic rock on the site made for a stable foundation to build their homes. Also constituting the site is a clay like soil called tepetate. This soil was largely responsible for the mud slides that occurred in the rainy season prior to the paving of the street.

Installation of electricity and water preceded the sewer system. Likewise street paving occurred after sewer lines had been installed. The dwellings themselves however were often built of permanent materials such as concrete block, tabique or brick before these basic services were provided. This observation seems to negate the usefulness of sites and services housing projects which see the primary needs of the dwellers as the installation of basic services.

Figure 2.11  The street from below. Note street paving material
Observations: The Dwellings

Almost all dwellings in the neighborhood have flat roofs. A possible reason for this is the ability to build on top of it at a later point in time. Another possible reason is the ease of construction with the concrete frame and brick infill which is the most common form of building construction in Mexico City. Because wood is currently not readily available in this region of Mexico, wooden roof structures are not usually found. The latter building material lends itself more appropriately to some form of pitched roof construction. Another activity or use which is quite commonplace in Mexico City is for the flat roofs of houses to be used as a place to do and dry laundry and locate household pets such as dogs.

Because this is a neighborhood which is in transformation and being upgraded constantly the streetscape reflects this variety in the stages of dwelling construction. Currently there is an approximately even mix between one and two storey dwellings. Some dwellings still have less-permanent construction such as asbestos roofs or even tin roofs over loosely placed blocks. Heavy stones are often placed over the latter to prevent wind uplift and to secure the roof. In some cases there is a well defined facade wall facing the street behind which the dwellings are hidden. Often this occurs when the dwellings behind are still of a temporary nature. Some street fronts are plastered and painted while others are still unfinished. Often a finished portion will sit right next to an unfinished portion even though occupied by the same owners.
Figure 2.12 The dwellings on Calle Acacité Looking south
To the right is main commercial street Calle Moctezuma
FORMAL ORGANIZATION AND TYPOLOGY.
The three most distinct formal elements which organize space in the majority of dwellings in La Pastora are
- The Zaguan
- The Patio
- The Salon (Sala)

The zaguan.
The zaguan is the term which refers to the transition space which connects the public street to the inner courtyard or patio. This space is linear and directional towards to the patio and perpendicular to the street. It is a spatial link between the public street and the semi-public courtyard space. Because it connects two "light-zones", the zaguan is normally a darker space. There are normally no window openings from the adjacent room into the zaguan and the continuity of the two planar surfaces is maintained in most cases. As such the zaguan has more the character of path rather than place.

The traditional zaguan of Spanish courtyard houses has been modified in contemporary urban society to accommodate motor vehicles. This fact has caused the proportions and dimensional quality of the zaguan to modify somewhat. When used as a car garage its linear and directional quality changes. While still directional towards the patio, the width increases considerably and subsequently there is a lesser intensity

Figure 2.13 A zaguan/ car garage.
of spatial compression and dramatic movement from light to dark and through the lighted courtyard again.

Another factor which changes the experiential quality of the zaguan is whether it is covered or uncovered. A study of house transformations in Mexico City reveals that often the zaguan begins as an uncovered passage. Through the process of time and as more rooms are added to the dwelling, it becomes a covered space. This is not always the case however depending on certain factors which will be examined in greater depth later, namely lot territorial divisions. In case study #3, for example, the zaguan was a long and narrow space connecting the street to a dwelling in the rear portion of the lot. Because the front lot was occupied by another member of the family an uncovered space and access had to be provided for the house at the rear. This is one such situation where it is unlikely that the zaguan will ever be covered in the future.

*Figure 2.14 An uncovered zaguan*
Figure 2.15  Study of open spaces of dwellings
The Patio

The Patio is probably the single dominant formal device that organizes the placement of rooms in the typical house in Mexico City and in La Pastora this is no exception. The patio as a formal device allows for light, ventilation and access to rooms on its periphery. Once established, it normally sets up the rules and guides the placement of rooms surrounding it. There are however exceptions to the rule and in some cases the patio is not as clearly defined and is not used as a major spatial organizing device. A detailed study of other housing typology in Mexico City is outside the realm of this thesis. Nevertheless, suffice it to say that the courtyard house is still the predominant house form in Mexico.

As mentioned earlier, the patio also serves as the major access zone into the surrounding privacies. In some cases there is secondary access between adjacent rooms which define the patio. This normally occurs when those rooms are occupied by the same social group such as a single family. The patio also acts as a transition zone between a more public and collective space to a more private zone which is the rooms. As such it provides for a richer experience of space as one enters from the street, through the zaguan, into the patio and then into the more private zones of the house. It establishes itself as a more public zone because it is in the light, being connected to the street by means of the zaguan. Spatial expansion occurs as one moves through the zaguan.
Figure 2.16 Studies of main zones of dwellings in Puerto Rico by Andrés Mignucci
from the street and into the patio. Likewise the reverse occurs when one leaves the privacy of the room to go out into the street.

On a use level, the patio supports a variety of activity. It may be used as a gathering space for more social events such as fiestas or parties whenever the families host one. There are often trees which provide shade and sometimes fruits for local consumption. It may be used for the washing and drying of clothes and the storage of water in *aljibes* or water storage cisterns.
The Salon (Sala)

The Salon or Sala is the main room which faces the street. Because of its proximity and visual access to the public street, it often takes on a more public use such as a living room, dining room or a multi-use room. Depending on the point in time at which an analysis is made of incremental house forms, it is possible that a salon does or does not exist yet. In some cases, the users start from the rear end of the lot and build incrementally towards the street. If this is the case it is possible that rooms that directly border the street have not been built and may not be for a long time if there is no need within the dwellers for such additional space. Even if there is, with more modern and contemporary construction methods of reinforced concrete post and slab construction, there is the possibility of building on a higher floor. It is possible that in older dwellings which were pre-industrial revolution and utilized more masonry and wood construction, dwellings were much more ground-based and gravity bound.

Consequently, there are situations were the house form does not meet the street directly but sits behind the street with a small front yard or open space. This however is an exception rather than a rule based on the analysis of the houses on Calle Acacite in La Pastora. In some cases, where the house is still being built incrementally and there are plans to build right up to the street edge, the street facade is defined a priori with a wall which may or may not have openings in it.

Figure 2.19 A self-built dwelling in another neighborhood. Note placement of sala.
In terms of spatial organization, the salon is normally adjacent to the zaguan which connects the street and the patio. Because the street is a public zone it makes sense to have the public activities nearer to the street. Access to the salon is primarily from the patio as opposed to directly from the street. This serves to confirm the use of the patio as the major means of access to the dwellings and privacies. In cases where there is a car garage, access to the salon is still normally via the patio although there are some cases where access from the zaguan is observed. This often is a function of how wide the car porch is. In many cases the porch is just wide enough to fit a car and allow the driver to open the door. In such cases, there is often insufficient room to access the salon directly. Occasionally one finds the salon located at the rear end of the lot. This may occur in single family dwellings which have been built incrementally, beginning from the rear of the lot out towards the street.

Support and service spaces.

Support and service spaces such as kitchens and bathrooms tend not to have any particular order in terms of their placement. The general principles determining their location are often the access to ventilation and light. Traditionally, the bathrooms were located towards the rear of the houses. Currently, bathrooms still tend to be located away from the street as opposed to adjacent to the street edge. There are, however, as always, exceptions to this. In some cases, where the owners have more economic resources and have built their dwellings in one stage.
bathrooms may be located on the second floor of the dwelling to serve the private zones of the house upstairs.

Likewise, the main consideration determining the placement of kitchens is the access to ventilation, light and also its adjacency to dining areas. It is also a logical design decision to locate these areas in approximately the same zones so as to facilitate the location of water and plumbing. This is true in plan as well as in section. Often service zones are aligned vertically as well.

**The façades.**

Older Mexican urban environments take on a character of Spanish Colonial architecture. Over a period of several centuries, however, Mexican architecture has developed its own "style" or character. Even though, there is no one single homogeneous Mexican style most contemporary houses take on a certain "minimalist" quality. They tend to express a certain simplicity and purity in image. The emphasis is to express the planar quality of the surfaces of the dwellings rather than its three dimensional quality.

There is a definite desire to have finished surfaces which are normally plaster over brick and mortar. Whether or not this is the image of the "modern" house or not is uncertain. The more well to do may have marble facing on their house facades as it is more readily available in Mexico than in some countries. Consequently, unfinished surfaces are finished and painted as soon as the dwellers gain sufficient resources.
Color is used to accent form and to highlight window, door openings and cornices. The paintability of plaster allows for individual interpretation and expression of the users over time. Analysis of old dwellings in Mexico reveal layers of different colors which these dwellings have been painted over the process of several centuries. Also in vecindades a continuous row of identical apartments will be painted in different colors to define the more private territory which is being occupied.

Most dwellings define their windows horizontally rather than vertically. One possible explanation for this is the technology which is now available in which walls are not load bearing but rather infill as opposed to the load bearing walls of colonial Spanish architecture. As such horizontal openings would not in any way affect the structural integrity of the walls.

The size and dimension of street-facing windows appear to be more or less constant. Patio-facing windows tend to be more varied in terms of their orientation and dimensions. In case study #4, the courtyard facing windows are significantly larger than the street-facing windows of the same dwelling. Perhaps this reflects a certain attitude of Mexicans towards the street in which it is in some ways seen as "hostile" and hence less visual connection with the most public zone. Studies in other neighborhoods suggest that when larger street-facing windows exist, they tend to be on the second floor and high up in the façade composition.
CHAPTER THREE  FOUR CASE STUDIES.

Figure 3.1  The four case studies

Casa del señor Ricardo Hernandez

Casa del señor Faustino Ramirez

Casa de la señora Marta Nieves Bravo

Casa de la familia Nieves
Contemporary popular culture is able to express without excessive constraint its sense of scale, space, proportion, form, colour, while at the same time reproducing cultural models to which people are constantly exposed. How is it possible to introduce this rich inventiveness into institutions responsible for training minds and moulding imaginations without undermining them?

Lucien Kroll

Method of Study.

The four houses under analysis are located off the cross street Calle Acacite. Three of them are located on the southern side of the street (i.e. their street façades face north) and one of them faces south. Even though a study of more than four dwellings would serve to be more accurate in observing patterns of transformations, nevertheless these four houses already illustrate certain observable formal qualities in common.

As mentioned earlier, this observation and analysis is based on an earlier extensive observation done by Jorge Andrade on dwelling transformations in a neighborhood called Santa Ursula in another part of Mexico City. The hypothesis here is that if the dwellings in La Pastora reflect similar spatial organizations as well as follow the patterns of growth and transformations of those in Santa Ursula we can make more specific theories about urban incremental dwelling growth and understand the process in which urban tissue is created.

The information about the house transformations in these case studies was obtained through informal personal interviews with the home-owners in which the owners described what the conditions of the site were 25 years ago when they had just arrived. Photographs and sketches of the houses illustrate the stages of dwelling growth. The purpose of this analysis was not so much to thoroughly document the house transformations but rather to help inform the design proposal for the support framework later on.
CASE STUDY #1  La casa del señor Faustino Ramirez.

This house occupies the corner lot at the intersection of the major commercial street and vehicular access to the neighborhood (Calle Moctezuma) and Calle Acacite. Observation of the lot and comparison to earlier maps published by the Department of Public Works show that the lot has been divided into two smaller lots. Mr. Ramirez's house occupies the smaller lot which is the corner lot while another owner occupies the lot at the rear which is accessible from the commercial street. When the observation was done in June of 1988 the house consisted of two bedrooms, a living room a kitchen, a toilet and a small dining area. There was also a temporary structure which stored protected unused building material. According to Mr. Ramirez, he was in the process of building a second floor to his house. (See photograph). Currently Mr. Ramirez lives with his wife and four little children. He is currently retired but used to work for the Mexican Armed Forces. Mr. Ramirez has five children, two of whom are married and no longer live in the immediate compound. Entry into the living quarters is through an outdoor patio.

Stages of dwelling growth.

Like most of the other residents of La Pastora, Mr. Ramirez came to La Pastora over twenty-five years ago. With very little economic resources, he built a little temporary shelter for himself. There was a make-shift kitchen on the street-facing wall and a mixed-use room.
Since there were no basic services of sewerage, electricity or water, these had to be illegally tapped. There was a temporary out-house placed at the rear of the lot.

When the family had earned a little more, they built another room at the rear of the house and added a toilet by the street facing wall (Calle Acacitl). The old make shift kitchen was removed for the placement of the toilet. The third main stage of construction was the adding of two smaller rooms adjacent to the rooms which were earlier built. The current of these rooms are an eating (dining) area and a kitchen at the rear. This added zone has a narrower dimension than the first built rooms owing to the fact that they are more transitional zones rather than private bedrooms.

One unfortunate result of the adding of these rooms is the obstruction of natural light and ventilation to the bedrooms and living rooms. Also the bedrooms facing the street does not have a window out into the street either further making it a dark and dinghy room. It is not clear why there are no street facing windows on any of the two façades. Perhaps there has been a desire to be completely private and inward looking rather than looking out to the public street. It is possible that with the passing of time, Mr. Ramirez may decide to demolish part of the street wall to accommodate some window openings. It is not clear either whether there will be any street facing windows from the upper floor rooms which are currently being built.
Stage 1 Mixed use Room  Stage 2 Living room, bedroom and toilet added

Figure 3.2 Stages of dwelling transformations
**Stage 3**  Kitchen and dining added

**Stage 4**  Upper floor bedrooms and toilet.
Figure 3.3 Volumetric study of dwelling growth
The three rooms on the second floor which are in the process of construction will be used for Mr. Ramirez's daughters and their families so that they can all live in the same compound. Access to the rooms and privacies remains through the unbuilt open patio. Unlike the traditional Mexican house there is no zaguan as a transition from street to patio. Instead, the main door from the street leads into the transition/circulation zone from which the sala (living room), the comedor (dining area) and the recámaras (bedrooms) are accessed. Window openings are only into the open patio. Between the sala and the bedrooms is a curtain which allow some light to enter but in very limited amounts.
CASE STUDY #2 La casa de la señora Marta Nieves Bravo.

The second house analyzed is that of a nuclear family of la señora Nieves, her husband and four children. The entire family occupies the current house and the children are still young and share bedrooms. Like many other residents of the neighborhood, Sra. Nieves came to La Pastora with her family 28 years ago. She was still single and lived with an extended family. After getting married, she and her husband started working on their house and as the need arose for more room due to the arrival of offspring, new rooms were built.

The first observation of the house is that it occupies the rear portion of a nominal lot (10 by 25 meters). Entry is via a narrow and uncovered zaguan which runs along the adjacent house which is occupied by one of her brothers and his family. Subsequently, there is no street facing facade whatsoever but there is still an outdoor patio around which the rooms are organized. The front portion of the lot which contains her brother's house appears not to have a direct relationship to señora Nieves's house. Instead there seems to have been an imaginary line drawn between the boundary of her house and that of her brother. This suggests that this lot division acts as territorial divider such as found in urban situations where there is no exchange between adjacent lots through the use of party walls. In my opinion, however, this is not a good design solution and results in the house having an ambiguous relationship to the street. Perhaps the nominal lot size was just too large.
and expensive for single or even extended family to purchase and build on and had to be subdivided into two lots.

**Stages of dwelling growth.**

The first dwellings built were of temporary materials such as cardboard and metal roofs held down by heavy stones. As in most other cases, there was a provisional out-house and kitchen. The first room to be built was placed at the rear corner of the lot. This was a mixed use room serving both private and public activities. The next room built filled in the entire rear portion of the site and allowed for some separation of more public and more private spheres of dwelling. At this point in time, there still were no sewer or water services.

The next rooms to be built were the kitchen and the toilet. These were built perpendicularly to the earlier rooms and defined the patio. As the family gained even more resources and need more space, a second floor was built. This was done in two stages; the first being the two rooms at the rear of the lot which sit directly above the living room and multi use room on the first floor. These rooms are currently being occupied by the children. The last stage of construction was a hall-way connecting the stair to the bedrooms. This is used as a little sitting area and has access to a balcony overlooking the patio.
Stage 1 Mixed use room and out-house  
Stage 2 Division of public and private rooms  
Stage 3 Kitchen and toilet

Figure 3.6 Stages of dwelling transformations
Stage 4  Upper floor bedrooms

Stage 5  Upper floor hallway and lounge.
Figure 3.7 Volumetric study of dwelling growth.
The patio is used for a variety of purposes including drying clothes and the storage of additional building materials. It is also the primary means of access to the privacies that surround it. There is a tree planted which provides shade and help define the patio as an "unbuilt-rock". The entire house is finished both on the inside and the outside. It does not appear that there are any plans to build additional rooms or to add another floor. Because the lot is of a relatively small dimension (10 by 12 meters), a lack of buildable space could be a further deterrent to more construction. The only portion of the house which has the image of incompleteness is the entry off the street. Possibly this was last in the list of priorities of placing the resources into the living spaces rather than in the transitional spaces. As such the walls have not been plastered or painted yet and the masonry is exposed.

Because this is a single-family dwelling, the access to rooms is a combination of internal and external circulation. On the ground floor there are two doors leading from the patio into the house. One leads to the hallway where the kitchen, bathroom and dining area and living room are located. While one main door would have sufficed, the presence of the second entrance allows for easier access to the second floor, which would otherwise have to have been accessed through the living room.

Once on the upper floor, circulation is primarily internal, although one of the bedrooms is accessed from the outside balcony. Hence, there is a combination of internal and external circulation.
CASE STUDY #3. La casa del señor Ricardo Hernandez

Figure 3.8 Looking north from higher level.

Figure 3.9 Looking south
Note building frame exposed
The third case study is a house which is more built than the first two. Unlike the first two studies, this house does occupy the original lot dimension. Entry to the house is via a symmetrically located entrance on the street level. As in traditional Mexican houses there is a zaguan which connects the street to the semi-public patio on the interior of the house. One notable feature of this house is the way in which it addresses the landscape on which it was built. The patio, unlike traditional dwellings, is on a higher level, which is actually the second floor of the house. Due to the change in grade between the front of the lot and the rear, the raised patio serves to connect and organize the house effectively in three dimensions.

This house is an example of a multi-family dwelling. Several rooms on the upper level toward the rear of the house are occupied by a friend and his wife. Over a period of years the rooms on the front portion of the house have been used to house members of one large family. At this point in time however, the house is being under-used. The rooms which at the rear if the lot are used merely as storage and not being actively inhabited. As members of the family grew older and got married, some preferred to live in another house nearby (up the street) rather than within the compounds of the original house. The owner is an elderly man who is one of the ancianos (elders) of the neighborhood and was one of the earliest dwellers.
The front portion of the house is a neighborhood convenient store which sells refrescos (soda), candy and other food items. Originally, this room was a living room but was converted into a sundry store several years ago. In the process the window got filled in and plastered over. Access to the store is through the main entrance to the house which is directly off the zaguan. As such when the main door is closed and locked, there is no direct visual access to the store or to any knowledge that it exists.

On the ground (street) level are the store, the salon the kitchen, dining area and a toilet which is embedded into the rock and clay. Going beyond the ground level, a stair connects to the upper level which is the outdoor patio level. This becomes the reference level and access to the rooms on the second floor is via this patio. There is a large water cistern, a tree which gives juicy fruit and a stack of building materials in this patio. The patio is the major means of access to the privacies on the second floor and circulation in this house is predominantly external. The patio is also used for gatherings such as fiestas and for drying clothes.

**Stages of dwelling growth**

Señor Hernandez started building his house from the rear of the site. The two rooms which now are used as storage were initially multi-used rooms that served public and private activity. After their completion and as the family grew in number and in financial resources, they started to build from the street-edge inwards. Throughout this time work was
being done to excavate and make inhabitable the difficult terrain due to the abrupt level change between the front and the rear of the house. The third major stage of building was the addition of the second floor over the street-facing edge. These became the bedrooms for the large family. At this point in time the zaguan which connected the street to the patio became covered. (It was probably uncovered before the construction of the second floor.) During this stage of construction the structural members for framing one room were left exposed because of no need for an additional room for the nuclear family.

In the fourth and final stage of construction, a series of rooms were added on the east side of the lot towards the slope. These rooms are currently occupied by non-kin inhabitants and are rented by the owner of the house. These rooms have private bathrooms attached and are autonomous to the rest of the house except for sharing the patio, and entrance. It is interesting to note that rather than filling the already in-place structure on the western side of the lot with these new rooms, the decision was made to build a new series of rooms on the side of the lot which was unbuilt. Perhaps this was a response to light and the possibility of the rooms receiving the afternoon sun and not casting shadows onto the patio area. Another possible reason is so that these rooms could enjoy a better view of the area down the hill rather than looking up into the hill. Yet another possible reason could be the use of these rooms as a certain kind of retaining wall against the steep slope.
Stage 1  First two rooms and out-house  

Stage 2  Lower rooms on street side built

Stage 3  Kitchen, dining, bathrooms and additional bedrooms built.

Figure 3.10  Stages of dwelling growth.
Stage 4 Upper floor on street edge begun

Stage 5 More bedrooms on upper floor added.

Stage 6 Rooms for friend and wife added
Figure 3.11 Volumetric study of dwelling growth
In terms of its attitude towards the street, this house has a symmetrical façade composition with the entry clearly identified in the middle. Window openings are neither extremely large nor small. There appears to be a standard window size (1 by 2 meters, horizontal) that are employed in many of the houses in Mexico City and the same are found on this house. There is a second floor balcony with an iron railing (screen) and this acts as a minor transition and zone of exchange between the street and the dwelling. According to other sources, these narrow balconies are more a functional item rather than aesthetic. They protect the unfinished masonry from moisture when the walls are not yet plastered, a state which may last several years while financial resources are being augmented. In my opinion, however, these little balconies are more than just "wall-protectors". They do help express the floor slab of the building and suggest the way in which they have been built as well as express the structural capacity of reinforced concrete to cantilever. This could almost be seen as the current vernacular of houses in Mexico.
CASE STUDY #4 La casa de la familia Nieves

Figure 3.12 View from patio looking south towards street Note narrow covered zaguan

Figure 3.13 View of patio Note window size
In this final case study, we see the most built housing complex. This family is the same family of the señora Nieves whose house is case study #2. Currently, this is a multi-family dwelling occupied by four nuclear families with members from the same family. Hence it is an extended-family living situation. Each apartment has its own kitchen, living-room, dining area, bedrooms and bathrooms. From conversations with one of the residents this arrangement reduced problems which could arise from sharing common areas such as kitchen and bathrooms. The fact that each apartment is autonomous has come about through a process of growth and transformation over 28 years. As in Jorge Andrade’s studies of dwelling transformations, this houses went through an equally long period of time before apartments which originally shared common spaces grew to be autonomous units.

Like case study #3, it occupies the entire original lot dimension with no internal subdivision of lots for nuclear families. It is a building typology which is clearly organized around a courtyard. Rooms on three sides define this outdoor patio. Access to the units is through a narrow covered zaguan on the western side of the street facade. This zaguan leads to the patio which is the principal means of access to the apartments on the inside.
Stage 1. Living room, bedroom and toilet at rear of lot

Stage 2. More bedrooms added

Stage 3. Second floor begun Family #2

Stage 4. Second floor completed

Figure 3.14 Stages of dwelling growth.
Stage 5  Front street-facing rooms begun

Stage 6  First floor completed.

Stage 7  Second floor built
Figure 3.15  Volumetric growth of dwellings
There are two main stairs which service the upper floors. One is on the exterior of the house and one is on the interior. The external stair services the rear two apartments while the internal stair services the street facing units. One interesting note is the option of entering into the street-facing apartment on the first floor directly off the street. It is not clear how often this entrance is used because there is another entrance into the street-facing apartment from the patio area (as is commonly the case in courtyard houses in Mexico). The rooms are generally oriented towards the west, that is overlooking down the hill towards northern Mexico City. Circulation, as in case study #2 is both internal and external.

Another interesting feature about this house is the treatment of the window openings. The street facing windows are smaller in dimension than the courtyard-facing windows. This seems to suggest that the house is more inward focussed as opposed to outward or street focussed. This is a salient characteristic of many courtyard houses and does provide for a very rich architectural experience of penetrating a hard and strongly defined street edge towards the inner world of the courtyard. Also, within the courtyard-facing windows themselves there is a hierarchy of dimension, with the living room windows being larger than the bedroom windows.
Some observations on patterns of house transformations

From the four case studies as well as the studies done by Jorge Andrade in Santa Ursula we observe similarities in patterns of dwelling growth and can gain understanding on how urban fabric is generated. In self-built neighborhoods such as La Pastora and Santa Ursula, the dwellings normally begin as shelters with non-permanent building materials. Depending on the economic resources of the owner he may build one or two room shelters initially. Such dwellings are often found when tenure rights are not yet secured and there is the possibility that the owner may have to move from the land that he is on.

Once tenure rights are secured (and often before since there is usually not a clear cut process of securing a title to one's land) dwellings begin to be built with permanent materials such as brick and concrete. Assuming a dweller with minimal resources who has just come into Mexico City from the surrounding countryside, the first room to be built is a Multi-use room. As the term implies, this room is used for a variety of purposes depending on the time of the day and the people who are using it. It takes on both a public use for living, dining and cooking as well as a private use for sleeping. Sometimes the kitchen is not located within this room to avoid odors and for more ventilation. In such cases, cooking is done outside underneath a partially sheltered space. Likewise eating sometimes occurs outdoors depending on the weather and occasion.

Figure 3.16 A multi-use room
Note presence of all elements of living in one space.
In the early stages of dwelling construction, basic services such as electricity, water and sewerage are not yet available. As such, water has to be brought in from outside and electricity illegally tapped from neighboring areas. Toilets take the form of out-houses with a sand pit located in the yard or patio (which is normally still an open large piece of land). If the dwellers have relatives or neighbors nearby with usable toilets, these spaces may be shared by several families. Often nearby neighborhoods have public baths which can be used for a small fee.

The next room (or series of rooms) to be built normally allow for the segregation of the more public and the more private aspects of life. One room is normally used for living, dining and cooking while the other is used as a bedroom. Here again, the number of rooms which get built in the first and subsequent stages is a function of the needs and economic resources of the owner.

The third observable stage of house transformation is the addition of the kitchen, dining area and bathrooms. These three rooms do not seem to have a specific order in terms of which gets built first. It is partially a function of whether the basic services have been installed or not. Also in the case of multi-family dwellings it is common that there exists one kitchen and bathroom for shared use at the beginning. As time goes on, the separate families build their own kitchens and bathrooms. This process is described in greater detail by Jorge Andrade in his thesis.
Figure 3.17 Studies of dwelling transformations by Jorge Andrade
Another observable pattern of house growth is that it normally is "bounded by gravity." This means that the rooms on the first floor are built before rooms on the second floor. Some exceptions to this case are when the landscape is particularly difficult to work with or the height of the street has not been established when initial construction began. Case study #3 is an example of rooms on a higher level being built first. This is a direct result of the landscape and the level change between street and room location. Nevertheless, there still exists the possibility in multi-family dwellings for lateral expansion on the ground floor apartment even after the second floor has been built. Such may be the case when the two apartments are occupied and owned by two separate families. The possibility of the upper floor apartments extending laterally without a corresponding growth of the ground floor apartment is much more unlikely, however.
Figure 4.1 The Site Inhabited.
Proposing an alternate scenario of incremental housing

This section of the thesis explores the design of a physical framework that becomes a reference for user transformation and incremental building. The scenario is presented in which, the site is maintained but instead of being built entirely by individuals, the architect is involved in providing formal clues and design decisions with which the future user must interact. The levels of design intervention corresponds with the different levels of control that the architect can have in the generation of urban tissue. The question is asked of how much control an architect should have within a context of self built houses. The question is not asked if an architect should be involved at all because this thesis pre-supposes that he will act. Instead the question is in what capacity and intensities design decisions are made and in what areas of the site. In this case the parameters and context of design intervention is half of the city block along the street Calle Acacite.

Given the site to start with, I have gone through a series of explorations which deal with different levels of design interventions in different areas of the site. The site is basically one side of the entire block of Calle Acacite which runs up the hill bounded by lateral streets Calle Moctezuma at the lower end and Calle Ometicutli at the upper end. There are currently ten lot subdivisions on this side of the street each measuring approximately 10 meters wide by 25 meters deep.
Into the Site,
From the Inside:

To claim space,
To place elements;
To change the site;
Is to control one's own

To share elements by naming them,
To share space by dividing it,
To share rules by obeying them,
Is to live with neighbors,

For one to move and the other to contain,
For one to close and the other to give access,
For one to receive and the other to provide,
Is to find the world in order.

John Habraken
Finding an appropriate lot size

At the early stages of the design explorations, an attempt was made to propose an alternate system of lot dimensioning as a means to allow for more variety and yet directing the growth of the houses. From the analysis we see that the lots have been primarily under-built and the land not utilized well. As a result the density of this street and neighborhood is not as high as it could be. The assumption here is that a higher density of housing in this neighborhood is a desirable thing owing to the fact that Mexico City has reached its limits of expansion for new areas for urban development.

An attempt was made to look for alternate lot sizes which had been used by the city in partitioning lot sizes. It was found that another common lot dimension in Colonias proletarias was on that averaged 125 square meters, resulting in dimensions of 7 by 16 meter deep lots. The 7 meter width is not arbitrary. It allows for a zaguan and a sala to exist adjacently while allowing privacies to be built along one side of the lot: overlooking an open patio. This dimension also allows a car port and a sala to exist adjacently.

It appears that based on observations of courtyard row-houses in Mexico City of this dimension, there are two main ways of dealing with the lot. The first and most common solution is to build around the lot and forming an enclosed patio in the process. In this scheme most rooms have access to light and ventilation and look out directly onto the patio.
Access is primarily external (through the patio) or a combination of internal and external.

A second solution is to build along the entire width of the site while utilizing light wells and air wells to provide light and ventilation to all the rooms. In this case there is normally no clear open patio but rather a series of light wells. In this latter example, circulation is predominantly internal and internal corridors are used to connect the rooms. Apparently, this latter form of house typology has influence from western (mostly North-american) suburban houses where houses are more tightly organized and circulation is entirely internal. In such cases, there may exist a small yard towards the front of the house.

The decision was made to establish a basic 8 meter lot width size for the support framework that would suggest more clearly a "U-shaped" building organization around a patio rather than having a double loaded corridor situation. This dimension can still incorporate a zaguan and two rooms adjacent to it (the sala and a smaller room which could be dining area, kitchen or small bedroom). This dimension can also allow for a carport on one side of the lot and an adjacent room. Although this dimension suggests a courtyard building typology, it can still accommodate an internally organized house along a corridor with light and ventilation wells.
To cater to the different needs, sizes and economic resources of different families, several different lot sizes have been proposed. In the middle of the site, there is a lot measuring 10 by 25 meters, the dimensions of the current lots. This larger dimension suggests that there could be a more public function of the house such as a sundry food market or candy store. There is also one lot which is shorter and one lot which is longer than the nominal 8 by 25 meter lot dimension. These cater to families of different sizes and that can afford to purchase more or less land. Having a longer lot provides a richer spatial experience and adds a level of complexity to the urban fabric when built over time.

Another design decision has been the arrangement of lots facing the lateral streets which have vehicular access. Currently, there is no acknowledgement of the intersection of cross and lateral streets. The current condition of the lots running parallel to the main access streets results in these more important streets having less interaction with the houses and thus less opportunity exists for them to take on a more special character. Hence opportunities for commerce and other urban activities is compromised by a poor design of how the lots are to be laid out. One possible reason for the consistently parallel division of lots could be an attempt to conveniently deal with the landscape. Nevertheless, especially on the lower end of the street where the slope is not as steep, it is still possible to have houses built over an incline. The lots higher end of the street the are 20 meters deep and are designed so that houses could be built split-level such as in case study #3.
Figure 4.4 Lot division proposed
The lot division proposed tries to address the intersection of lateral and cross streets so that both systems of streets can have main facades of building with lots extending away from the street. Also the corners are seen as having special potential for special activity and architectural articulation. At this point, it was decided that on the upper corner of the street, a non-thematic building (a church) would be designed while at the lower corner, a more articulated framework that suggested mixed retail, commercial and residential use would be designed.
Figure 4.5  The original landscape reconstructed

Figure 4.6  First physical intervention: Levelling the Site
Making habitable the landscape.

To begin the design exploration the original landscape is reconstructed. Given the original topography and the incline of the site, an attempt has been made to be more sensitive to the ground form by means of extensive terracing of the ground plane and a minimum of cut and fill. Even though it is impossible to know exactly what the original landscape was like, I have attempted to reconstruct it and to start from the beginning based on the information received from old lot division drawings put out by the city.

The first physical design intervention proposed in this scenario is the levelling of the slope. This act itself already sets up a ground reference for where to build within the given lot divisions. Depending on the exact lot location, all the lots have at least two different ground levels to build on. The decision to not level the entire lot, as mentioned earlier is both in response to work with the slope rather than against it and to set up the first level of support framework. Lots on the higher end of the site may have up to four different levels to build on. While these level changes may appear to inhibit rather than facilitate the building of rooms over time, they are intended to increase the architectural quality of the houses to be built requiring that these be split-level. This design decision also makes one more aware of the particular context and landscape which is a steep slope and not an arbitrary piece of land in the middle of nowhere.
Figure 4.7  Ground plane-Landscape study
The next level of landscape intervention is the construction of the retaining walls between lots. Even though apparently there is sufficient rock in the earth to build directly upon, these walls are still provided as an additional structural precaution against soil erosion. Perhaps more important is the role they play as an architectural element which defines the lot and adds another level of clues of the support framework. This wall is designed to allow for the insertion of structural elements such as beams and floor slabs. It is to this wall that most of the subsequent rooms will connect.

Also adjacent to this wall is the incorporation of a sewer and services (water) linkage which extends a certain distance from the street into the lot to allow for the linking of sewer and water lines when they are provided at a later date. To one side of the wall (which is the side on the higher elevation) the major access zone to the dwellings is proposed. Hence the idea is to run the service pipes in an area of the building which will not be built over later in time. This would be the zone of access from the street, through the zaguan and into the courtyard. The intention is for the service pipes from kitchens and bathrooms to hook up by way of the outdoor patio to the service tubes provided as part of the design intervention.
'Form itself has to contain the incentive that provokes each person into making the choices most appropriate in his current circumstances. This unusual kind of hospitality is the feeling for people, their values and their dignity which should be inherent in everything we make.'

Herman Hertzberger

Figure 5.1 The Basic Support Framework
Note level changes and location of orange tree
Level of the Dwelling.

A series of explorations on the nature and intensity of the support framework were made. This was perhaps the most difficult design exercise to perform. It is easy to teach designers how to make all the necessary design decisions and to be in complete control of the design process. With the design of a support framework the task was not so easy. The perpetual question of "how much is enough or too much?" continually arose. On the one hand it could be argued that there really is no need to design any framework because the dwellers can build for themselves. This approach really begs the question raised at the beginning of this thesis which is "Should the architect get involved in the housing process?" Since we assumed that design intervention was necessary in creating a better urban environment we then proceeded to examine the ways and the levels in which an architect or designer could get involved. We have seen also that often "mistakes" or poor design solutions are the result of a purely self-build approach to housing as seen in case study #1 where the main rooms of the house had no windows or access to natural light.

One approach that can be taken is solely the design of the interphase between the public and private zones of the dwellings namely the street-dwelling transition. Going on the premise that this zone has the most "public" facet in the streetscape, an architect could be responsible for designing a façade for the houses. There have been examples of purely façade design of low cost houses behind which there
Figure 5.2 Early Support Framework Study
is complete freedom for the user to build. This approach, nevertheless, has problems because the designer does not concern himself with any of the spatial or architectural qualities of the dwelling that lies behind the façade. The façade remains, as such, purely a façade.

One could go a step further and say that a certain zone or dimension between the street and the dwelling could be designed in which more clues could be given as to the form of the subsequent organization of the dwelling. This does mean more design and more control by the architect but I believe that this option is better than the first.

I have chosen to go even a step further and "invaded" into the entire lot in an attempt to articulate even more the built framework. An attempt is made to design not only the interphase between street and dwelling but also access zones and the transition between open patio and privacies. In this sense, I have concerned myself with the design of the more public areas of the dwelling. The designed piece at the rear of the lot is a built reference which being incomplete encourages completion to form various spatial configurations.

Early in the design studies of the support framework, the notion of claiming the unbuilt patio territory as an important organizing piece of the houses was explored through the use of architectural elements such as trees. The idea of planting an orange or lime tree in the open unbuilt zone is another means of discouraging the encroaching privacies from being built in the open patio zone. Studies of colonial Spanish settlements suggest that over a sufficiently long period of time there is the
Figure 5.4 Early Study Model of Support

Figure 5.5 Framework and infill
tendency to "over-build" and invade the patio. In such instances, there is a significant reduction in the amount of light and ventilation of the surrounding rooms. In my opinion, this is an undesirable condition and the planting of a tree as part of the provided framework is an attempt to claim the territory surrounding the tree as important. Nevertheless, the possibility still exists that over time, the tree may be cut down to allow for the addition of more rooms. Still, the hope and desire is that a certain dimension of the patio be maintained even as the framework gets more added-to over time.

Throughout the design exploration, extensive use of the model has been employed to visualize the three-dimensional quality of the support framework and its relationship to the landscape. The notion of the retaining wall as an important element of the framework would not have been discovered by means of drawings alone. Likewise, the articulation of the ground planes as another design clue was a direct result of three dimensional explorations of the support model.
Figure 5.6 Early plan of framework
Figure 5.7 Inside-Outside study of framework and infill
Figure 5.8 Intermediate study of Framework. Note intensification of street edge.
Intensification of the Street Edge.

Most traditional neighborhoods in Mexico City have very hard and clearly defined street edges. While this does give definition to the street and emphasis the continuity of the wall along the street edge, it is at times over-bearing. There is often no visual connection whatsoever to the semi-public courtyard spaces that lie hidden behind the street façades. Ironically in the more affluent neighborhoods the row-houses tend to "retreat" away from the street edge and there is a transition zone between houses and street, not unlike the traditional American home. Perhaps we can conclude that this is a luxury to have a front yard to a house given the scarcity of land in metropolitan Mexico City.

Nonetheless, the support framework which I am proposing attempts to intensify and at the same time soften the street edge by having set-backs on approximately half of the width of the lot. In a sense it is a compromise between pulling the entire dwelling away from the street and having an entirely planar and harsh street edge. Also the option is given for half of the street facade to recede to varying degrees or not to be built at all. In the latter case, there is a possibility of having a car garage in this zone.

Figure 5.9 Edge intensification Jardin de la Virgen de Guadalupe
Figure 5.10  Support and infill with early study of neighborhood church and street intervention
Figure 5.11 Early Light study of inhabited support
Figure 5.12 Early Light study of inhabited framework  Section along street
The topology of the site also affects the nature of the support framework. The dwellings toward the higher end of the hill have more design elements at the street edge to suggest the building of a zaguan which connects to the inner patio. The zone for the zaguan is 1.4 meter wide and allows for a salon and a small room adjacent to it to be built over time. The lots at the lower end of the street have less design elements at the street-dwelling transition. This allows for the incorporation of car garages as this area of the street is accessible by cars and not the higher end of the street. This car garage area then becomes a transformed zaguan which is wider than the traditional zaguans as mentioned in the earlier analysis of house typology in Mexico City.

Figure 5.13 Support Framework  Note varying intensities of design clues (columns)
Framework Construction System.

The building system proposed for the support framework is a conventional reinforced concrete slab and column system with masonry infill. A variety of masonry infill systems exist in Mexico City, most in the different varieties of *tabique* or brick. Concrete masonry units also exist and is more durable and resistant to seismic activity. These are more expensive and more often used in public buildings such as schools, markets and offices. Adobe is still used as a building material in Mexico but is not commonly used in contemporary building in Mexico City. The majority of low-income dwellings have bricks that are manufactured locally containing mixed composition of volcanic rock, stone and sand. There is an extremely light variety of masonry called *tabique blanco* and this is recommended for non-structural infill on the second and upper floors of houses only.

The retaining wall dividing the lots is seen as a reinforced concrete block wall with openings on the upper surface to allow for the insertion of steel reinforcement at certain predetermined intervals which will connect to the construction of reinforced concrete beams and floor slabs. Floor slabs which are part of the framework are provided on the main street facing room and at the rear of the lot. These slabs are designed for up to two additional stories of construction above.

*Figure 5.14  Common building materials*
Service Zones.

The location or proposed locations of bathrooms and kitchens are seen to be generally unfixed. Because of the unpredictability of when services are installed in such situations there is a great deal of freedom in the location of these zones. Nevertheless, some structure has been provided by means of the dimensioning system which the retaining wall sets up suggesting rooms of different sizes which suggest uses such as kitchens and bathrooms. Also the unbuilt patio with the orange tree is intended to be the intermediary zone of connecting the sewer and water lines to the mains which extend in from the street.

Circulation and Access

Based on the analysis of the four case studies and from information gathered about dwellings in colonias proletarias, there has been a decision to favor external circulation and access to privacies and rooms rather than internal circulation with the extensive use of corridors. Climatic conditions in Mexico City allow for external access to rooms as long as it is partially enclosed. The main need is for shelter from the rain during the summer months.

The support framework articulates this zone of access as the interphase between the outdoor patio and the privacies. A zone running along the middle of the lot has been established as the main circulation area which works on whichever side the rooms are built. This zone is seen to work also on the upper level of the dwelling.
From left to right- #1 is smallest lot division, #4 is 10 meter wide lot, #5 is uninhabited framework

Figure 5.16
#6 has two smaller patios for two family dwellings, #7 is longest lot for multi-family dwelling
#8 is single-family dwelling with sala at the rear. Note space for car garage.
#9 is corner framework for mixed-use
Figure 5.17 Middle lot 10 meter wide accommodates other use such as local grocery store
Two main kinds of street access exist in the dwelling framework. The primary access for the units is an assymetrically located entry which leads directly into the zaguan and then into the patio. In the middle unit on the street which is 10 meters wide, the entry is symmetrically located. This leads to a covered zaguan which is designed incorporated as part of the framework whereas it is implicit in the other frameworks. Also provided is a stair leading to the unconstructed upper level. This particular support framework is more articulated at the transition zone between the street and the dwelling.because it is seen to have special opportunities for more public activity or use such as a conversion to a sundry store. This has been seen to be true in the analysis of case study #3. The design of the built framework then becomes a strong reference and suggestion for future use and is not intended to be a neutral framework.
THE COMMERCIAL CENTER

Figure 5.18 The Commercial center
The corner lot at the bottom of the site is a modification of the basic support framework. Because the corner is a special condition and presents unique design opportunities the support framework has been further intensified to suggest retail use such as a restaurant, small convenience stores and offices above. The architect has been given more design liberty and control of this building owing to the fact that this building is likely to be more public than the rest. The rear of the lot is seen as being a more private zone and suitable for residential use. It is common in Mexico City for buildings to support a variety of use and there is often a close connection between where people live and where they work. In this case, the business could be a small and family owned.

In terms of the level of design intervention, the entire street-facing edge of the building has been designed and the rear of the building is intended to be filled-in over time by the users. Also, rather than the one-storey support framework of the residential units, this corner piece has two floors designed and built. Like the residential framework, the open patio is used as an organizing element in the building. It also serves as a transition between the more public street-facing zone of the commercial area and the more private zone of the residential area behind. This framework has the capacity for more vehicle parking on the residential street side, Calle Acacité. A formal stair located at one end of the patio connects the ground floor to the upper floor which can accommodate offices or additional apartments.
Figure 5.19 Second floor plan

Figure 5.20 Early study model for framework
Figure 5.21 First floor plan
Note patio as divider between public and private zones
Figure 5.22 Commercial center as marker in dialogue with church at top of hill
More energy and design has been given to use this building to mark and address the corner at an urban scale by increasing the height of the first floor and by the addition of a partially built third floor with a corner "marker". As will be seen later this building also relates to the neighborhood church at the top of the street and the two buildings are designed to be in continual dialogue. More liberty has also been taken to create larger interior spaces such as the double height entryway into the proposed restaurant with a surrounding mezzanine.
Figure 5.24 First floor plan
Figure 5.25 Section

Figure 5.26 Elevation from Calle Acacite
Figure 5.27 View up street

Figure 5.28 Early sketch of commercial framework
Figure 5.29 Side elevation from Calle Acacite

Figure 5.30 Corner definition
CHAPTER SIX  NON-THEMATIC INTERVENTIONS.

'Si Jehová no edificare la casa, En vano trabajan los que la edifican'

Salmo 127:1

Figure 6.1 The neighborhood church
The Neighborhood Church.

This church serves as a non-thematic element and the focal point to the street. In it, complete liberty has been given to the architect to create an architectural work of beauty which gives a sense of arrival and place to the journey from the bottom of the hill. Because it is a public building it is able to express the values and aspirations of a larger segment of society rather than that of individuals. It lies in a domain in which professionals have always felt comfortable corresponding with their traditional roles in designing architectural works of beauty.

The church is not large. It has a seating capacity of about 200. It is meant to be for an evangelical congregation which is currently a minority in Mexico. Because of the rather ambiguous relationship between the evangelical population of Mexico City and the predominantly Catholic majority, this church has a more limited degree of "publicness" than would be expected of a normal Catholic church. It would probably be open for public access on certain days of the week during which cultos or services are held. It would also be used for activities such as prayer meetings, Bible studies, evangelistic rallies and campaigns, social gatherings (convivencias) and be the residence of the pastor and his family. Depending on the number of official celebrations in Mexico such as Independence Day on September 15, the number of people using the building could vary from 15 to 250 persons at any given time.
Figure 6.2 Early study model of church

Figure 6.3 Early sketch of church floor plan
Figure 6.4 Roof plan of church
Figure 6.5 Floor plan
The building is organized into four main zones: the sanctuary and worship hall, the gathering space, classroom and living spaces and the outdoor courtard which connects all the spaces. The pastor's residence is on the third floor which has views to the inner courtyard as well as the street. There are two major means of access to the church. The main entrance is on the upper level which is at the level of the first outdoor placita (little plaza) and the second entrance is of the second lower plaza. This second entrance leads directly to the patio and establishes a visual and spatial continuity between the inner more private courtyard and the outdoor more public plaza. The pastor's residence is accessed by way of the gathering space which is adjacent to the worship hall facing the street.

The gathering space is seen as a space for informal gathering before or after services. Fiestas or convivencias could occur in here and its dimensions allow for larger groups of people than the classrooms downstairs. There is a little kitchenette which is used for preparing or reheating food for the frequent "fraternal meals". (Comida fraternal) Towards the rear of the lot is an additional multi-use room which overlooks the patio. Underneath one side of the worship hall are additional classrooms used for Sunday School, seminars and the annual Vacation Bible School activities for the neighborhood children.
'But suddenly you touch my heart, you do me good, I am happy and I say:
"This is beautiful."
That is Architecture. Art enters in.'

Le Corbusier

Figure 6.6 View of the curved roof
The worship hall itself expresses the dome of heaven by means of its parabolic arched roof. Lighting is a combination of diffused and direct lighting. Direct lighting is carefully controlled by means of screens and light shelves on the western and eastern sides of the sanctuary. The northern and southern ends of the curved roof have narrow openings which wash the inner surface of the lightweight concrete curved shell with light.

The curved apse of the church echoes the curved roof and is slightly raised for the location of the pulpit, minister's chairs and baptismal pool. On the northern end of the church is the main entrance. Ascending a series of stairs from the outdoor transition zone between the plaza and the church brings you into the worship hall. The gathering hall is directly accessible to the right of the outdoor space. There is also a direct internal connection between the worship hall and the gathering space so that people can move directly after a service into the gathering space without having to go outdoors first.

Linking all the enclosed spaces is the outdoor patio which serves as an unbuilt "rock". Acting as a light source and an open core it is like an open hearth and a focus for the rooms and spaces that surround it. Because it is a zone which is in the light, it has a more public character and as seen as a place for people to be. Organic elements such as trees and plantings add character and definition to the space. As in the dwelling support units and the commercial center, the patio is connected to the street by means of a transition space, the zaguan. There is thus a
Figure 6.8 Side elevation from Calle Ometicutli

Figure 6.9 Front elevation
very important formal and experiential link from the public street through the zaguan (dark) into a semi-public area (light) of the courtyard.

In terms of activity, the patio is the most used space for larger public gatherings such as fiestas or convivencias. When the church gets together for a "pot-luck " meal or some kind of celebration, the patio will almost certainly be used for the setting up of tables and chairs for the seating of people. Likewise in the summer time when Vacation Bible School is in session for the neighborhood this space could be used for games for children and the projection of movies in the evening. Looking directly into the patio at the lower level of the church are classrooms and a mixed use room. These classrooms could be used for Sunday School classes or other activities depending on the program of the church. The mixed-use room towards the rear of the patio can be used as shelter for needy persons such as youth coming to the city looking for employment and without the support of their family. The lower level rooms also have access to bathrooms and small kitchenette.

Acting as a marker and a beacon in the streetscape is the church tower. It identifies the church from a distance as a major public place and a focal point for the street and surrounding neighborhood. The tower also helps to balance the formal composition of the main worship hall and the secondary gathering space.
Figure 6.11 Section through worship hall
Figure 6.13 Street intervention Looking down the street
The three existing plazas at the top of the street have been transformed into public places for the residents of the street and in adjacent streets. Because the street is the most public level of the neighborhood organization and is accessible to everybody, it has become the stage for intervention by architects and designers without interfering with the privately built zones of the dwellings.

Proposed is a series of public places connected by the existing stair which has been transformed and designed to engage more with the plazas. The problem with the original stair was that it was only a "point to point" connector. It served only as a means to get to one’s dwelling or to the top of the hill. I have proposed that this very important architectural element become a celebrated form in the streetscape. The new stair takes on a processional quality and is also a place in itself. By virtue of its dimension and slope, it can be used for people to stand up against the railing and look down into the plazas when there is a celebration or gathering of some kind.

A modification has been made to the stair as it approaches the upper end of the street. Rather than running parallel to the street edge all the way to the top of the street, it changes direction as it reaches the first main plaza overlooking the church. In doing so it acknowledges the change of direction with the major lateral street at the top of the hill and also allows one to appreciate the presence and beauty of the church from a distance. Similarly, the existing stair which connects the highest plaza to the lateral street is relocated to run towards the tower of the
Figure 6.14 Building the crescendo of the architectural promenade from the bottom of the street
church. Set up, thus, is a continuum of movement and access which brings one from the bottom of the street through the lower plazas up the formal stair into the main plaza facing the church and up to the next lateral street.

Corresponding to the promenade from the bottom of the street to the top is an intensification of architectural experience along the same journey. Trees toward the lower end are more sparsely planted. At the top they are more densely planted. A special and larger tree is planted in the main plaza overlooking the church and its placement channels and directs movement through the plaza. As you ascend the street you are made aware of the "look-out point" which demarkates the termination (or beginning) of the park-plaza zone towards the higher end of the street. The lower end of the street maintains accessibility to vehicles while the upper end is reserved for pedestrian use and enjoyment.

Another element of architectural delight is a water sculpture-aqueduct which collects water at one plaza level and spouts it out into a pool at the lower level. The idea behind this aqueduct is not just to celebrate water and the symbolic qualities and association which it has for the Mexican people. Formally it is an important element which horizontally registers and makes explicit and perceivable the changes in the topography. In doing so it intensifies and makes one aware of the steep incline of the hill which would otherwise not be as apparent experientially when walking up or down the street. Made of reinforced
Figure 6.15  Aerial view of plaza in front of church
Note stair placement

Figure 6.16  Path-Place Diagram of outdoor rooms
concrete the incomplete arched forms of the supports are a memory to the ancient aqueducts which have been used in pre-colonial Mexico.

Interspersed throughout the series of "outdoor rooms" are benches which help to define the boundaries and edges of these rooms. These are seen as the intervention of either architects, builders or the private residents themselves. Like the dwelling support structure but at a different level, and attempt has been made to provide some clues and design frameworks which suggests transformation, inhabitation and completion. Low dividers located a certain distance from the dwellings on the northern side of the street help establish a certain territory between the public plazas and the private dwellings. These dividers also correspond to the width of the sidewalk and together help create a transition between public and private.

Also interspersed throughout the open rooms are areas for plantings of different varieties of flora. These organic elements contrast against the predominantly hard surfaces and materials of the rest of the streetscape. Maintenance of these elements is seen as being by the residents of the street themselves even as it has been seen that they have been responsible for most of the construction in the street. The public authorities would not have any interest, desire or capability of maintaining the beauty of the street.
CHAPTER SEVEN

RECONSTRUCTING THE SCENARIO.
Figure 7.1 Stages of Formal Intervention (plan)
Figure 7.2 Aerial view of inhabited framework
Figure 7.3 Floor plans of inhabited framework
Figure 7.4 Stages of Formal Intervention (section and elevation)
Figure 7.5 Elevation of inhabited framework
Figure 7.6 Section of inhabited framework
Figure 7.7 Elevation of inhabited framework
A brief evaluation.

This thesis began by exploring a possible scenario in which a series of dwellings in La Pastora could have been built had an architect been more involved in the process. The economic context is one of lower-income users who came to the neighborhood with little or no economic resources. For the support framework which I have proposed to have been built, some organization (public or private) would have had to supply the funds to level the land, to build the retaining walls and to erect the support framework. There would need to be some form of mediating structure between city authorities and the user. Whether this takes the form of a housing cooperative (which exists in Mexico) or some other collective organization the designer can be involved even at this stage of the process.

Designers are also needed in the process of the laying out of the street grid and lot divisions owing to the fact that these dimensions do play a significant role in determining the form of the houses later on. The lot division I have proposed takes into account the various needs of future users as well as suggests opportunities of the lots for other non-residential use. The middle lot which is 10 meters wide is an attempt to suggest a such special uses.

Likewise the commercial-residential framework at the lower corner of the street becomes much more built and designed owing to even more design opportunities that a corner site offers. The lot at the upper end of
the street is seen as being claimed early on in the process for the construction of a church.

From an economic standpoint, it can be argued that the construction of the support framework would be minimal compared to the traditional approach of providing complete houses which are beyond the economic capacity of the urban poor to purchase. Perhaps a certain contractor could be involved in building these frameworks throughout the city. The advantages of having one single construction company to build over the entire block as opposed to the traditional piecemeal construction by individual users is obvious. Costs are reduced when materials are purchased and utilized in larger quantities.

One possible drawback to this is the tendency for construction companies to build as much as possible and to provide complete houses because of the larger profit margin involved. To avoid this it would be necessary to find some kind of non-profit organization to be responsible for this building (which is a rarity in Mexico City). It is conceivable, however, that if the public sector showed a genuine concern and desire to provide low-cost housing for the urban poor, it could be responsible for subsidizing much of the cost of the built framework.

One advantage of having the city provide a built framework for the dwellings rather than providing core-houses which only provide the basic services is that it is under less obligation to install the basic services expediently. This can go along well with the traditional incremental growth of houses using permanent materials even before the installation
Figure 7.8 Aerial view of inhabited framework
of sewer, electricity and water systems. The public sector also has much more control over policy-making and the construction of large scale areas suitable for housing.

Unfortunately, but not surprisingly, housing is only one of the many issues which beface Mexico City today and the government has not kept up to its word in really addressing the need for affordable housing in its broadest sense. Projects intended to be for low-income inhabitants end up being purchased by speculative middle-class buyers and later occupied by them.

It is conceivable that a framework such as the one proposed in this thesis will be a workable means of providing shelter for the urban poor and also integrate them into the life of the city by providing other services necessary to urban living. The commercial-mixed use framework and the neighborhood church and the landscaping of the street are seen as interventions which help to enhance the quality of urban life and allow for a dynamic relationship between the user and his built environment.

It is likely that it will have to take many years before an environment such as the one which has been proposed could materialize. Because of strict economic constraints it is uncertain how much the residents of the street would invest in transforming their street into a beautiful park and place for rest and recreation outside their home. Perhaps an initial poetic intervention in the street will lead to subsequent artistic contributions which the public can appreciate. The hope is that "commitment breeds commitment" and that the work of certain individuals
will inspire other individuals to get involved in designing the environment in which they live.

Also contemplated in this design exercise is for the architect to be somehow involved in an "architectural education" setting. Perhaps the neighborhood church or the communal centers could become places where models of how the built frameworks could be inhabited over time are displayed so that people from the entire street and neighborhood could come and see how their houses could look like. Also on display could be examples of what not to do to avoid overbuilding into the open patio space.

After all is said and done, it appears as if the framework as it has been proposed may not be as suitable and feasible for the lowest income groups but perhaps for the middle-class instead. An alternate scenario is that of a private developer being involved in the construction of the framework and showing the different housing configurations possible to prospective middle-class clients. In such an instance the earlier scenario of the models on display for the public could be imagined for the prospective buyers of these houses instead. Because variety is a marketable commodity in real estate enterprises, private developers could be thrilled with the idea of a support framework that allowed for various spatial configurations of houses to meet the different needs of the clients.
"If we have learned anything over the past years it is that buildings can no longer be thought of as static monuments. They must be responsive to the different and changing needs of people. We must design highly articulated physical frameworks that can provide a reference for growth, change and dreams. What we do then is not the end but an exciting beginning."

Jan Wampler

Conclusion

This thesis has been a personal struggle. It has been a struggle resulting from the examination and definition of the role of the architect in today's society. An attempt has been made to explore the different dimensions and realms of control and design that an architect can have in the area of housing. Throughout this exploration there has been uncertainty about "how much control is too much?". On the one hand there is the desire to allow for freedom on the part of the user to form and create his own dwelling as time, resources and needs demand. On the other hand there is also a desire to control and to set up a system of rules which can help improve the architectural quality and image of our cities.

Architects as professionals who study and create form must be the ones who understand, influence and direct the built frameworks within which our cities need to grow and nurture themselves. Architects and designers need to understand the processes that are at work in our cities which give physical form to the invisible structures and rules within a particular culture. It is not enough to merely observe urban form outside the realm of a specific culture. Instead there is a need to understand built form as a human act arising out of specific human circumstances. Such knowledge can then become a tool which can be used in designing inhabitable frameworks for housing.

What is proposed in this thesis is a method which encompasses an idea about professional practise. It incorporates a broader spectrum of
what housing does as well as what it is. It is an exploration into the possibility of a more symbiotic relationship between designer, builder, craftsman and user. A different range of levels of participation between user and designer have been explored; from the lesser intervention of the architect in the dwelling framework to the more designed commercial center to the neighborhood church and street interventions.

Also implicit in the design exploration is the notion that the support framework for housing must not be "neutral" in that it must be clearly articulated and suggest a certain form and organization of space. The residents began, in a sense, with some form of framework provided by the city, namely, the standard lot sizes. The assumption here is that this framework was insufficient in that it provided too much room for interpretation in the construction of houses. As a result there is a wide disparity between the location and placement of the outdoor patio area. Certain houses do not address the street at all and retreat to the rear of the lot (See Figure 2.3). Several rooms, especially the corner rooms do not have direct access to natural light and ventilation.

Architects are in the position, by virtue of how built frameworks are designed, to control to a certain degree the process of dwelling transformation to ensure that certain design criteria are met (such as natural light and ventilation). As mentioned earlier this built framework must facilitate and accommodate the placement of rooms based on a knowledge of how the houses transform. This knowledge can only come
about from a study and observation of what the dwellers themselves have done over a period of time.

In closing I would like to imagine another scenario in which the dwelling framework consisted only of the design of the interphase between street and the dwelling. Perhaps this would be more feasible solution given the ability of the residents to build their own homes with the little economic resources that they had. The framework would then have to be something which was provided for them a very minimal cost and heavily subsidized by either the city or some other organization.

It is no longer possible to see the role of the architect as solely to create monuments and "works of art". The pressing need for housing in our contemporary cities cry out for a working method in which architects can help alleviate the housing problem. What is not desired is repetitive and lifeless complete houses or equally lifeless and neutral frameworks of core-houses. Add to this the social, economic and political forces at work in a given culture and we have affordable and beautiful housing as the design challenge of this century.
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