

DETERMINING CRITERIA FOR LOW INCOME HOUSING  
IN MEXICO CITY

by  
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DETERMINING CRITERIA FOR LOW INCOME HOUSING  
IN MEXICO CITY

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This thesis is the result of a field trip to Mexico City. It is an attempt to determine a structure of needs for the low income population of the Federal District. This preliminary step would eventually lead to a different approach to the housing problem.

The old Aztec capital has grown tremendously, both in population and in area, spreading into the State of Mexico. The problem is how to house those millions of new households. San Juan de Aragon was a major attempt towards a solution. However, the houses were too costly and the physical environment too monotonous and oppressive.

The key to a viable housing project seem to lie in a natural integration process, where no one is forced to live in a certain project for economic reasons. Therefore, any housing scheme has to offer a great amount of versatility and flexibility in all aspects. Land security, proximity to urban centers and minimum amenities are pre-requisites. The project has to offer enough flexibility to satisfy all other needs. New financing schemes should be devised and new architectural systems should be investigated. One such system is the Mitchell system of prefabrication where only the structural core is provided to the occupant. The idea is to leave everyone free to choose, alone or collectively, one's own living environment.

Thesis Supervisor: Ralph Gakenheimer

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Introduction

It would be a trite banality to state that the shortage of housing is one of the most serious problems of any developing country. Mexico City faces most of the woes of rapid population explosion in a multiplied way ! In the post war period the Mexican Government has tried most of the "miracle" solutions proposed by technology. Prefabrication having proved to be a failure, was soon replaced by self help. But disillusion damped initial optimism when it was discovered that the main attractions of this system, cost saving and

variety of design turned out to be illusionary. "In urban housing projects, the more self-help required of the occupant the greater must be the inducements, supervision and administrative costs."<sup>1</sup>

Instead of waiting for the administration to come up with solutions, the population provided its own form of shelter by squatting in Colonias Proletarias around the federal district.<sup>2</sup> These semi-illegal settlements already comprise 40% of the total urban population and the end of the growth is nowhere in sight. This phenomenon is not in the least surprising considering that the advantages - low-cost home ownership, proximity to work, mutually supported friendship network, access to opportunity, far outweigh the legal and sanitary drawbacks. Squatter settlements demonstrate the possibilities, given the alternative, for the Mexicans to build and live in their own chosen physical and especially social environment. Government attempts to curb or even control those settlements have been so far as futile as their efforts to solve the housing problem.

The failure of these housing schemes comes basically from two factors, one being the erroneous belief

1. Man's Struggle for Shelter in an Urbanizing World-  
Charles Abrams - MIT Press- pg. 170
2. For more inf. see Harth Deneke's MIT thesis 1966.

that housing can be dealt with separately from the whole social context. Lisa Peattie's statement about Caracas' Barrios also holds true for Mexico City, "We will have to shift from a focus on buildings to one on people and social institutions and social trends, from a focus on housing standards to one on housing needs, to one which treats housing not simply as economic and social goods, but also as economic and social resources."3 The second error that the Mexican planners made was that, often by-passing their own cultural and sociological background, they imposed Western standards to their endeavor for the sake of efficiency and national progress on an international scale. The third error was the belief that "rapid economic and physical development is retarded by a pluralistic political process."4 The planner knew best what was good for the people. But by so doing, he by-passes the true needs of the people thus alienating them from the whole process and creating higher levels of dissatisfaction and lesser public support. "The principal resources for housing are those directly controlled by the people to be housed."5 The best examples of this are the Colonias Proletarias.

3. Social Issues in Housing - Lisa Peattie, JCUS April '66
4. Oldman, page 222 - Harvard Press
5. Environmental Security & Housing Input - Turner & Goetz

Camegie Review , Oct. '66



The role of the planner is then to give the people the means to use those resources to the full extent. He is assured that the squatter or former squatter will then "display a vigorous resourcefulness and a positive, constructive attitude toward the solution of his problem."6

The process of a search for a housing policy should then start with the establishment of a structure of needs of the people to be housed. Because a housing policy cannot solve all social evils in a society, these needs will then have to be sorted and the ones relevant to the housing situation will have to be singled out. A separation could be made between the more immediate necessities and the long range desires of the community.

Having those criterias on hand, an architect can then select what seems to be the best way of fulfilling those demands with the means and technology on hand, working in the context of the physical, economical and political situation of the particular place. This is in effect what

will be argued in this paper. The plan of the paper is

6. Squatter Housing: Criteria for Development, Directions for Policy - Neal Mitchell & Ian Turner

we will try to do in this paper. The plan of the paper is as such .....

- 1). A brief introduction to the physical context of Mexico City.
- 2). A personal appraisal of a housing project, San Juan de Aragon, where new concepts were utilized. This project has two parts-
  - a). Unidad San Juan de Aragon, which is a typical housing project.
  - b). a self help project which was also part of the general scheme.
- 3). A structure of the needs among low income residents in Mexico City.
- 4). A few possible solutions.

## CHAPTER I

I shall briefly summarize the urban situation and the factors that influence its changes. For a more detailed expose, I recommend Harth Deneke's Thesis.

### I POPULATION

The dramatic rise in the population in and around Mexico City is shown on Table 1. In 1950, Mexico had 2.3 M inhabitants. In 1990 it is expected to be around 14 million. The significant features in the growth pattern seems to be:

A) The slowing down of migration.

After the huge increase between the 40's and the 50's, migration accounted for only 31% of the increase during 1950 and 1960. Natural growth is the main cause of increase ( Table 2).

Families are large. In 1958, 46% of the families in the tenement area had 4 to 6 members and 23% had 7 members or more. The average density is between 500 to 600 per ha. with a maximum of

1. Gustavo Cabrero Acevedo, Analysis Demografico del D.F.

Thesis Universidad Nacional Autonoma de Mexico- 1963 p.67

2. Frieden, Page 77

630 in the Barrio of Tepito 3.

B) The consequence of the reversal of the migratory trend and of the high natural growth rate is that more single family houses are needed. Most of the migrants, who were single and young, have now married and need a place for their family. There is therefore a high demand for relatively small single family units.

C) The most important change in the urban scene has been the enormous increase in the Colonias Proletarias around Mexico City, in area and in population. Accurate figures are hard to obtain, but Table 3 shows the general trend. The average annual rate of increase in the population of the Colonias between 1950-60 was 36.7% when the city as a whole was growing at a rate of 16.7% 4. The estimate is that 50% of the population is living in those settlements at the present time. The increase in area is even more dramatic. Between 1950-60, the Colonias increased at the rate of 42% annually. The Colonias occupies about 50% of the total urban area today.5. The result of this trend is that:

1) Migrants stop crowding the tugurios

3. Ingeniera, Universidad Nacional Autonoma de Mexico-  
page 468.

4. H.D. Page 55.

5. H.D. Page 53.

and settle in the Colonias preferably.

2) There is a prevalent attitude that Colonias are a more viable solution to the housing shortage and therefore residents from the center migrate outwards to the Colonias.

3) These settlements have attained a semi-legal status with governmental agencies overseeing their growth. The Oficina de Colonias Proletarias supervises the recognized Colonias in the D.F. However, the tendency is more towards improving existing Colonias rather than planning for the future growth of such settlements. There is in effect no planning at the metropolitan scale.

## II PHYSICAL EXPANSION OF D.F.

The metropolitan area has spread largely beyond the limits of the Federal District into the State of Mexico. This growth is illustrated in the following table:

1910:	40 Km	<sup>2</sup>
1930:	81 Km	<sup>2</sup>
1950:	242 Km	<sup>2</sup>
1958:	273 Km	<sup>2</sup>

( Source: Oldman, p. 8)

The interesting feature of this growth have been:

A) The slowing down of the expansion of the higher middle class towards the south after a remarkable growth

best illustrated by Villa Obregón, a once swampy grazing ground which is now a very exclusive suburb. The growth was mainly along Av. Insurgentes Sud and La Reforma.

B) The rapid expansion toward the north and east, following the industrial boom. Table 4 shows the growth by Delegaciones. Madero, Ixtacalco and Ixtapalapa are all in the north and east.

Delegación	1950	1960	Increase (%)
G. A. Madero	204,833	560,752	173.8
Atzacapotzalco	187,864	300,079	59.7
Ixtacalco	33,945	166,866	391.6
Ixtapalapa	76,621	215,768	181.6
Tlahuac	19,511	29,228	49.8
Milpa Alta	18,212	23,776	30.6
Xochimilco	47,082	60,735	29.0
Tlalpan	32,767	54,409	66.0
Coyoacán	70,005	162,433	132.0
Magdalena Contreras	21,955	31,494	43.4
Obregón	93,176	198,218	112.7
Cuajimalpa	9,676	19,844	105.1
México	2,234,795	2,832,133	26.7
Federal District	3,050,442	4,870,876	59.6

Source: 1960 preliminary data from Dirección General de Estadística, supplied through courtesy of the Banco de Comercio, S.A.

C) The fantastic growth into the state of Mexico or more precisely in the municipalities bordering the D.F. This is a result of the tax exemption policy offered by the state of Mexico for industries.

D) The rapid shortage of land for housing. This is partly a result of insufficient surveying as well as plain shortage. Governmental, institutional and especially Ejido lands lying in southwest agricultural belt offer tremendous possibilities.

6. This analysis was taken largely out of Oldman, who in turn relied on Economía Agrícola, Flores

III ECONOMIC STRUCTURE 7.

We will limit ourselves to a brief study of income and welfare of Mexico's population.

TABLE B. DISTRIBUTION OF AVERAGE FAMILY INCOMES, FEDERAL DISTRICT, 1960.

Income Group (monthly)	Number of Families		Average Income Pesos	Income of Group		Cumulated upwards	
	No.	%		Pesos (x1,000)	%	% of Families	% Income
Less than							
400 pesos	52,026	5.4	333.73	17,363	0.8	5.4	0.8
401-750	165,231	17.1	588.21	97,191	4.7	22.5	5.5
751-1000	179,719	18.6	880.65	158,269	7.7	41.1	13.2
1001-2000	262,734	27.1	1,535.83	403,514	19.5	68.2	32.7
2001-3000	126,773	13.1	2,527.35	320,400	15.4	81.3	48.1
More than							
3,000	181,304	18.7	5,903.26	1,070,284	51.8	100.0	100.0
	967,787	100.0	2,135.00	2,167,021	100.0*		

Source: Computed from Secretaría de Industria y Comercio, Departamento de Muestreo, *Las 16 Ciudades Principales de la República Mexicana: Ingresos y Egresos Familiares* (México, D.F., 1962), p. 99, Table 6.

\*Columns may not add to total because of rounding.

Table B does not show the whole picture because it does not give the size of the family. However, we notice the extremely unequal distribution of income and standard of living. For instance 18.7% of the population dispose of more than 50% of the

7. For a more comprehensive outlook, see

Oldman, page 13-25

total income whereas 41.1% of the families enjoys only 13% of the income. 41 % of the families have an income inferior to 1000 pesos, which is barely enough to survive.<sup>8</sup> Table 5 gives additional information. The core of the city has a higher percentage of active population. This means that :

A) The populous suburbs have larger families.

B) There are more single people in the center.

Table 7 shows the average rent paid in Colonias, Tugurios and the D.F. The majority ( 83.6 %) in Colonias pay less than 100 pesos for rent. As compared to 42.3 for the D.F. in general.

Table 8 shows that in the D.F. 51.7% spend less than 10% of their income on housing. All these figures are eloquent. Most low income residents cannot pay more than 100 pesos for rent. This illustrates the failure of government agencies to solve the housing problem. IMSS units costs 52,000 pesos. The average cost of a unit in San Juan is 35,000 pesos. The rents come to more than 200 pesos a month.

This short expose is not enough to give the reader a clear image of the economic situation in Mexico City. However, they give a background to our following discussion.

8. According to Pablo Gonzalez Casanova, 700 pesos is barely enough for food, clothing and shelter for a family in 1956; 1000 pesos for 1971 is a conservative estimate.

Latin America; Reform or Revolution? J. Petras & M. Zeitlin



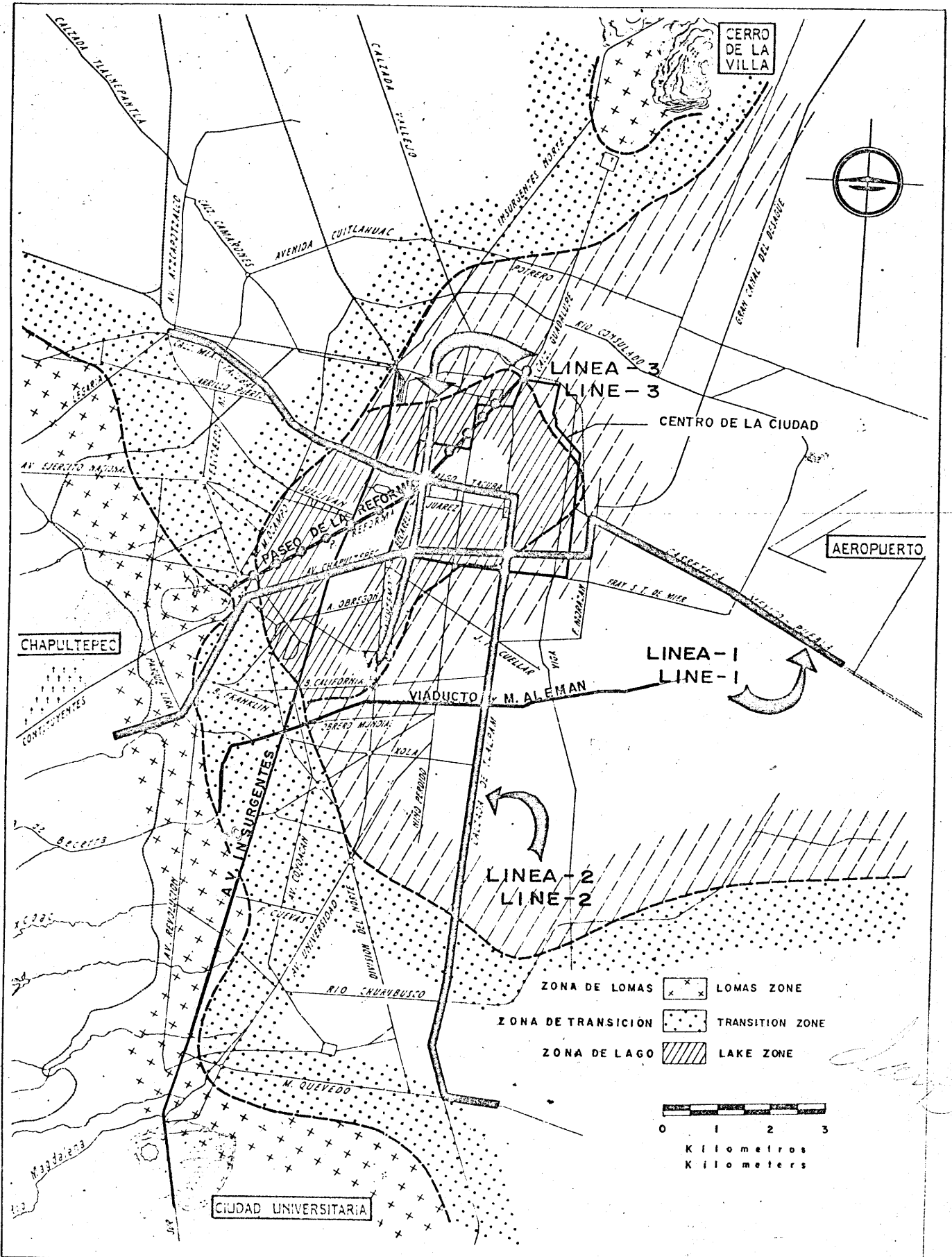


Fig. 1 Stratigraphic zoning of Mexico City.

NB IV THE GEOLOGICAL SITUATION

We keep talking about the particular geological situation of Mexico City. Plan II shows the stratigraphic zoning of Mexico City. It is accepted to divide the city into three zones;

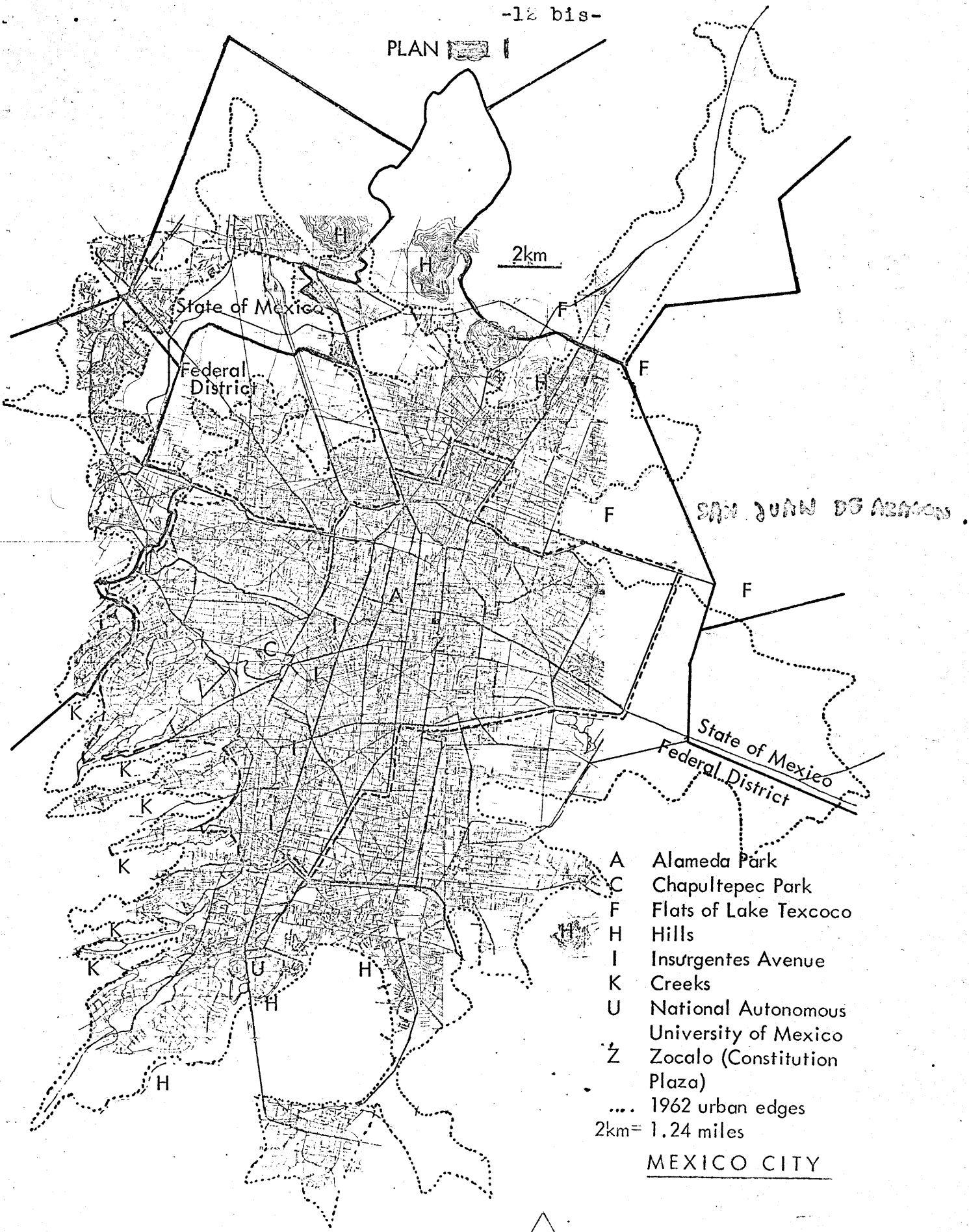
A) The lake Zone. Constituted of soft clay. The water content reaches 500% and produces large expansions when unloaded. Any housing project has to take this into account and provide a long term solution.

B) The lomas zone. Located on the west and south parts. Composed of volcanic tuffs and basalt. Therefore, they are very hard and not compressible.

C) The Transition Zone. Intermediate between two: the water content is around 200%. No special provision is needed to build a house 10.

10. A comprehensive study of the sub-soil condition can be found in the papers published by the VII International Conference on Soil Mechanics, Mexico- Aug. '69

PLAN 



SAN JUAN DE ARAGON

- A Alameda Park
- C Chapultepec Park
- F Flats of Lake Texcoco
- H Hills
- I Insurgentes Avenue
- K Creeks
- U National Autonomous University of Mexico
- Z Zocalo (Constitution Plaza)

.... 1962 urban edges  
2km= 1.24 miles

MEXICO CITY



CHAPTER II

While staying in Mexico City, I visited the San Juan de Aragón Housing project. This low income housing project was built by the Oficina de Habitación Popular created for this purpose by the Dirección General de Obras Públicas del D.D.F. The project is interesting for several reasons; its size, its location, the methods of investigation and the timing of the construction were all very novel.

This project was the first large scale attempt by the D.F. to solve the housing shortage problem. It was intended primarily for Indian families who lived in the neighboring hills, the Cerros de la Villa and for the families who had been displaced by the peripheral highway belt and other municipal projects. The irony is that most of the people it was intended for left and have been replaced by people who already had a house somewhere else but wanted a better house. We shall see the reasons for this turnover later.

The size of the project is imposing. The whole project covers about a 1000 ha. It includes the Bosque of San Juan de Aragón, which is a wooded area covering 250 ha. The project, when and if completed, will house upward to about 200,000 people.

Its location is also interesting for several reasons. It is situated for the most part on the filled site

of the lake Texcoco which provides for some interesting sub-soil problems. Namely, the whole site has a tendency to sink altogether and because of the salt content of the lake nothing can grow on the land. It also makes use of the Bosque, which is one of the rare wooded areas left in the D.F. The dream of the planners is to incorporate it within the project, as a sort of green lung for the neighborhood. It will ultimately challenge Chaputeltepec Park in size, facilities and visitors. However, due to its location on the northwest side of the city, it will grow into something more proletarian than the old Chaputeltepec. A subsequent advantage of the site was the location of the main drainage canal on the western side of the project. So one of the main infrastructure problems was solved at start.

The timing was political. The government in 1963 needed to show its willingness to solve the housing problem. Out of this short-term concern came San Jaun de Aragon. Architecto Medel who was head of the urban planning, himself asserted that the lack of time prevented serious investigation before the project was started. Due to the change of government after the completion of the first stage, few feedback studies were done. However, it is true that sociologically and urbanistically new approaches were used, but these approaches were the results of individuals concerns and ideals and not the findings of a preliminary study. The first stage which included the completion of the general layout and drainage system, the construction of 10,000 units (for a projected 80,000 inhabitants,

that is 8 persons for a dwelling on the average) was finished in 1½ years. The work is still going on now on other areas of the project. Quite a few improvements were included in this development. We will elaborate on them as we go along.

The limits of the housing project comprise of the Pueblo of San Jaun de Aragón in the north, the Colonias Proletarias of de Mayo, Damian Carmona, Romero Rubio and Peusador Mexico, the Airport in the south, the dried lake of Texcoco in the west and finally the Grand Canal of drainage in the east. With the help of photographs, I shall try to convey my own impressions as well as some of the new concepts developed by the Mexican urbanists and architects.

### I ECONOMICAL ASPECTS

The land was for the most part in the form of ejidos or communal farms. Bernard Frieden defines them as "agricultural land held in a special form of common ownership resulting from the land reform of the Mexican Revolution"1 and protected by the agrarian code. The farmers were expropriated, compensated and relocated (some of them in the project itself). The land, however, was not producing much because of its salt content and was more or less a grazing ground for cattle. The land was acquired at minimal cost. The development cost came

1. The Search for Housing Policy in Mexico City- Frieden

to \$20 per m<sup>2</sup>. The financing was done through the Banco National de Mexico. The average cost of a unit is about 47,500 pesos. The payment is by installments. The usual installment figure is about 180 so that the monthly rent is around 300 pesos or US \$25. Because the project is only 7 years old no one owns his house yet, but legally has title to it unless he leaves the premise. A life insurance which guarantees the property to the family in case of mishap to the father is included in the rent.

## II PHYSICAL LAYOUT

The project named Conjunto Urbano Peñón San Jaun de Aragón is divided into seven "Unidad Vecinal" or neighboring units. Each of these units is supposedly an independent entity separated from the others by large arteries, 42 m wide, with 3m wide sidewalk. Each of the Unidad has a service center and a market. This market, considered the focus of the resident's life, is the criteria for the outer limits of the Unidad Vecinal. No resident should travel more than 1200m to get to the market. These Unidad Vecinal are in turn divided into smaller units called "Super-Manzanas" or super-blocks. These blocks in the mind of the planners were comparable to a small neighborhood of 2500 to 5000 people; each Super-Manzana has a commercial and social center. There is a kindergarden and a primary school, some shops and

some restaurants. The limits of the block are determined by the distance between a house and the primary school; distance which is not to exceed 400m. This neighborhood concept was an attempt to revive within a new community the old patterns of Mexican towns which were destroyed by modern urbanization. Mexican sociologists asserted that up to 5000 people could live as neighbors, knowing each other and relating with each other, according to Arch. Medel. Each Super-Manzana is surrounded by a network of avenues; 18 to 20 m wide. In turn, these Super-Manzanas are divided into smaller cells by streets, 9 m wide. These streets are not meant to be thru-ways. Each street is separated from the avenue by a severe bump. This protection ideally would permit kids to play in the street. The grid system, similar to the C.A. Doxiadis' 2 geometric multi-moduli grid is applied here with rigor. The centers of gravity here are the market and the primary school. Whether this very artificially created pattern corresponds to any real needs is another matter. My personal bias is that it does not. The main criticism is the general monotony and coldness that prevails over the project. All of the streets intersect strictly at right angles. All avenues and streets as well as the manzanas have numbers instead of names. The fact that each unidad has a central tower with the number of the unit on it may help a lost passerby, but it does not create a sense of neighborhood.



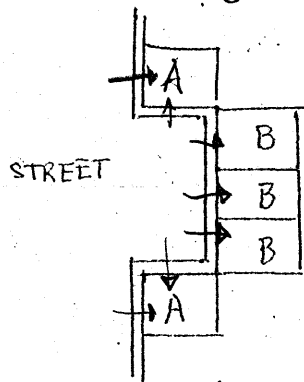
You cannot identify yourself to unit 4 or 5! The artificial boundaries of each unit forces people together instead of giving them the choice of friendship. Altogether the general orderliness and the coldness of design does not seem to be an expression of Mexican exuberance and color. All Super-Manzanas are strictly identical. There is absolutely no difference between neighborhoods which might trigger a sense of belonging, such as a special layout in streets or a concentration of a particular type of activities. As a matter of fact, the prime difficulty for a newcomer is direction and I often got the unpleasant feeling of being trapped in a labyrinth. This sensation is further enhanced by the soil condition. Everything is dusty. Houses, playgrounds, the service centers, and even the asphalted streets all have a yellow greyish air of uniformity. Because of the salt, nothing can grow. The trees are still minuscule after six years. Consequently, all streets are alike--endless rows of dusty one and two storied single family houses (see pict. 1 & 4).

### III HOUSES

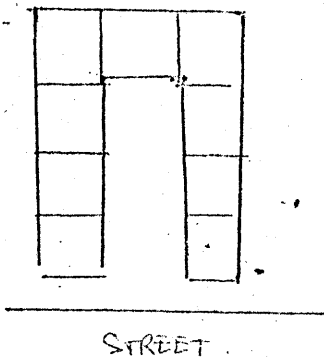
#### A) Physical Outlook

There are two types of houses. The type A (my denomination) has two stories, - four bedrooms, a kitchen, and a back yard. The construction is of bricks laid over a concrete slab which also serves as a foundation. The advantages of this system is that it is simple, cheap and it can withstand earth tremors as well as "float" on the water-gorged grounds of

San Juan de Aragón . Another slab is used as a roof over which another story could be built. When first delivered, the outside walls were bare. Since then many residents have either painted on the walls or have plastered them. However, because of the prevalent dust, most houses look grey, even though maybe one out of every three has been painted. The type B house is a low, one-story house squeezed in between type A houses in the following sequence...



This, according to the architect, was an attempt to break the monotonous pattern of row houses and also to develop a neighborhood awareness. This pattern B in some sense reminiscent of the old Mexican courtyard surrounded by one family, one room dwelling apartments.



The type B house has three bedrooms, a kitchen and a yard. The concrete slab foundation is the same as for the type A house but cinder blocks have been used more widely. Both houses have steel framed windows. The houses, even though 5 years old are generally in good condition. Improvements are prevalent on almost every house. Seldom is a house in its original state. Some people, who apparently have made some more money have added fancy extras such as the balcony on pict. 5. The most visible feature on the roofs are the T.V. antennas which seem to be on every single roof. My general impressions from the outside are of cleanliness but also one of monotony.

#### B) The Insides

Even though it is impossible to generalize a description after visiting a few houses, the following was observed throughout the project. As originally built, the walls and the floor were left bare. So the first impression is that of austerity and nakedness. By comparison, the outside looks much better in most cases eventhough it is again difficult to generalize because quite a few families have plastered their walls and decorated the house. There were no kitchen facilities when the first residents moved in. Only a stone sink with a cold water faucet. Most families have put in a stove (they use gas tanks, stored in the yard), a hot water heater, sometimes a refrigerator. The kitchen is very small and there is barely room for two persons to move. The kitchen leads into the yard

which is common to both type A and B. The yard is 10 x 10 meters. It was intended for the specific use of keeping a goat or a pig. Some still do have animals but most of them have been converted into either gardens, garages or just playgrounds. The problem is that the ground is so salty that nothing can grow. Soil has to be imported from outside if anything is to be grown on it. Quite a few have just cemented it. Again, this was intended for campesinos but when they left, higher income residents moved in and they did not see the need for a large yard. Interiors are mostly frugal. The furniture in general is functional: a table and chairs for the dining part of the living room, a couch maybe on the other side of the room. The T.V. has a prominent place among the furniture in the living room. The bedrooms are very small (see plan ) and therefore extremely crammed with beds and dressers, chairs..ect.. The electric bulbs are usually bare, hung by a wire from the ceiling. The bathrooms have the bare minimum, a tub, a sink and a W.C. There is, of course, running water which comes from a central reservoir next to the airport. Most interiors were kept clean and smelled good of tacos and hot peppers.

#### IV SERVICES AND SERVICE

An important chunk of the investment went to the service infrastructure. By any standards it can be called a magnificent success. General services cover 40% of the total area as compared to 15% for the other housing projects, public

or private. This change underlines the growing concern about the service problem and San Juan can be called the forerunner of the new trend. It is also the first time the service problems of a particular project was taken in the general context of the whole city. It is impossible to plan for such a huge community without thinking of its impact on the Metropolis in general. A typical example of this concern was the development of the Bosque for the San Juan project as well as for all the residents in the northwest section of the city and the planning of the drainage system so it can accommodate the whole area.

#### A) Infrastructure

1) Drainage: San Juan was fortunate enough to have the main drainage canal on its western edge (see plan 2 ). The main drainage pipes run under the large arteries separating the Unidad Vecinal. A useful addition was the sewage treatment center on the southern tip of the canal, another novel improvement. Water is provided with enough pressure and quantity.

2) Electricity: Power is adequate throughout the project. The planners wanted to put the cables underground for esthetic reasons but the cost proved prohibitive.

3) Transportation: This was the major concern of the planners. Most of the residents work in the center of the city. Therefore, transportation is heavy on the south and on the west. The main connections to the center are by the Periferico, the outside belt, and by Av. Oceania and

Rio Consulado (see map 2 ). Buses are adequate in number and frequency and seem to connect San Juan with the main centers of the city. No one complained about their service which of course is no indication of their efficiency but <sup>by</sup> my own experience it seems to be adequate. From the Zócalo, during rush-hours, it takes about 40 min to get to San Juan by bus and by car it takes about 25 min.

### B) Community Services

Here the greatest effort was made to satisfy the residents. San Juan has more services than probably any other low income housing project in the world. Cynics would point out that these services were not provided until about a year after the houses were completed. That is, after all the original owners had left and after a new government had come into power. This project is no doubt intended to be a showcase, but nevertheless it is impressive.

As stated before, each Super-Manzana has its mini-center with a primary school and a few stores. The Centro de Unidad Vecinal is a magnificent complex of buildings and sport facilities. It includes among other things, a market equipped with such ~~facilities~~ as a day care center, restaurants, sanitary installations; the recreational area includes a movie theater used also as a meeting place, a large gym and swimming pool as well as a park. Governmental agencies are alongside the police station, and the <sup>3</sup>lawyer's office. There is a secondary school, a library and a civic center. All activities are organized by the residents under the supervision of the Direccion de Action

Social of the D.D.F. Listing all the other services would be superfluous, but it is quite an impressive list. Even more impressive to my eyes was the pride and the respect the residents have for these installations. This is their own center and as far as they are concerned this is better than anything in the world. There is no vandalism, no trace of graffiti. Maybe this is a lesson for other projects and even other countries. When people are entrusted with valuable facilities, they turn out to be worthy of the confidence. This was especially true of the young kids. I met many of them on the project, and must admit that quite a few looked like hoods, but they were the ones most proud of the sports facilities. This is something I noticed throughout my trip in Mexico. The population respect what they think is built to last and is valuable. Buildings that look cheap (like the IMSS building for example) are quickly deteriorating. But good quality buildings are "protected". Kids play in the streets like anywhere else, but in the evening, the community center is overcrowded. Sport facilities cover a total of 91 ha. for the whole project. There is a definite emphasis on healthy bodies. But there is also a definite drug problem. Use of marijuana is generalized among youngsters and hallucinogens are prized.

#### IV SOCIOLOGICAL OBSERVATIONS

This chapter is the result of an informal conversation between some residents and my Mexican friend, Miguel Gerzso. Even though I had provided them with a set of several questions, the discussion was more or less a free form discussion. Most of them included their past residents, the degree of satisfaction with their environment and possible changes.

##### 1) Mrs. Martínez

Mrs. Martínez is a plump, middle aged woman. Her husband is a photographer. She has six kids. They live in a type A house. They used to live on Calle Costa-Rica, near the Zócalo in a "rent-frozem" section of the city and were paying only 75 pesos per month for a two room apartment. They came to San Juan in 1967 after the original residents moved out. The house cost them 51,900 pesos which included a life insurance. This life insurance guarantees the family the right to the house even if the father dies before completion of payments. This payment is done in 180 installments. The price of a house varies according to the size, location and age. Mrs. Martínez was generally very pleased with the house. Her main source of satisfaction came from the fact that she owns the house and that the community facilities are in ample provision. She does not have



to share the bathroom facilities (as she used to in her previous apartment). The garden (even though it was in a state of near disaster) is a source of extreme pleasure for her, and she considers expanding her house by constructing a little house, which she would like to be able to rent for additional income. Many already do even though it is outlawed. Her main objections were that:

- 1) The rooms were too small.
- 2) The windows do not let in enough light.
- 3) The insides should at least have been plastered.
- 4) The kitchen should have had more built-in facilities.
- 5) She misses the bustling activity of the downtown of Mexico City.

But basically she is satisfied. Had she ever considered self-help housing? Yes, but in its actual state, the houses are too small, too uncomfortable and her husband is too busy. She did not mind the monotony of design in the houses and the layout. She has friends spread out throughout the project. She was barely aware of the planners attempt to develop a sense of neighborhoods.

## 2) An Indian Family

There were nine in the house (which is a type B house). They were extremely crowded but the interior was surprisingly well kept. This family was particularly of interest because they were one of the original families, most of the others

left. Records were not kept but according to them, out of a 1000 families maybe a dozen have stayed. The reasons they left were quite simple. Most of them were living on the mountain Cerros and never paid rent when they came to San Juan. Others, saw an occasion to make a quick buck. After a few months they just sold their equity to the first comer (something like 600 pesos usually) and left with the money to go back where they came from. Others left because they were not prepared to live in such cramped conditions. They tore down windows, did not use the bathrooms, then finally left or were sometimes forced to leave. The reasons why this particular family chose to stay was according to the mother: The rent was reasonable and at the time it was impossible to find anything else. She was particularly impressed by the promise (at the time) of the children's hospital and social security. But she missed her friends from the Cerro and complained about the coldness and the lack of friendship in San Juan.

3) Chavolla - Av. 533 No. 26

This family came from th Colonia Morelos (Tepito) where all seven of them lived in one room, paying only 45 pesos a month. The father is a tax collector at a market and works for the D.D.F. He won the house in a lottery organized by his union after the house had been vacated. The whole family sat down and discussed with us for a whole hour several interesting points about the project. Their main gripe was in the

selection of families. The primary requirement was to show job security. Workers who were unionized had their house chosen by a system of lottery. But someone who did not belong to a union had very little chance of getting in. Originally a certain percentage was reserved for D.D.F. employees and other unions. This percentage has since grown tremendously. The second requirement was that they did not own any property. So they could only apply for the houses after they sold their house or whatever property they owned previously without having the guarantee of a house in San Juan. The distribution of this type of house came also under fire. The distribution was done according to the size of the family, but this practice led to conflict. Usually the larger families were poorer than the smaller families and could not afford the bigger houses. The rent was too high for a lot of families and this led to a high rate of turnover during the first years. But now people are staying because the land value and the house values are going up. Their house was bought in 1964 for 45,000 pesos and they estimate it to be now worth 90,000 pesos because of its location. The older the section the higher the price. As new construction sprang up, their section became the "old" section. As far as their house was concerned, they liked it on the whole, but the construction material was weak according to them. The corners needed reinforcement and vibrations of trucks in the street would crack the walls. However, at one time supposedly, a truck ran into the house and it stood up! They also mentioned one example among

others of the lack of preliminary study in the kitchen set up. The petrol heater should have been outside because of the dirt. When the planners realized this they put a sort of a screen which then prevented the access to the boiler altogether. Some lucky families can afford a gas boiler, but at 800 pesos, they were a bit more expensive than the 80 pesos petrol burner!

CHAPTER IV      SELF-HELP HOUSING

One of the Unidad Vecinal (on the north of the Bosque; see plan 2 ) was a mutual help project (Ayuda Mutua). The information that we obtained was very sketchy. The project was started during the last administration when self-help and mutual help were considered to be the solution to every problem. But when the new administration came into power, the whole project was stopped in July 1970. The land has since been sold in big chunks to various unions like the taxi union, which have had houses built by private contractors for their members.

1) Technical Dates

The project was under the auspices of the Direccion General de Obras Publicas and specifically supervised by the Oficina de Vivienda Y Urbanisacion. San Juan was one of many such mutual help programs. One of them is still going on in Axtapozalco as a matter of fact. The following are some numerical facts on Unidad Vecinal VI.

TOTAL AREA	-	777,593.73	m2	-	100%
LOTS	-	387,555.54	m2	-	49.9%
GREEN AREAS	-	70,000.00	m2	-	9.01%
AREAS FOR SALE	-	45,941.00	m2	-	5.92%
STREET AREAS	-	93,338.63	m2	-	12.02%
RIVER (ARROYOS)	-	179,758.56	m2	-	23.15%

The would-be resident had to buy the land. Each lot was of specific dimensions.

DIMENSIONS	AREA	NUMBER of LOTS	
7.24 X 17.50 m -	126.70	1586	- 58.24 %
10 X 17.50 m -	175.00	356	- 13.07 %
OTHER TYPES -		781	- 28.69 %
TOTAL -	301.70	2723	- 100.00 %

The lots are tiny compared to the Unidad de San Juan lots. The government provided the services (water, electricity, roads) plus promises of other community services comparable to the Unidad. As of now, only schools have been built and none of the beautiful civic centers ect. have been duplicated in Unidad Vecinal VI. On top of the services, the D.D.F. built for the enterprising owner of the lot the foundation slab and the steel reinforcement (see pict. 6 ). All the residents had to do is fill the walls as in pict. 7. The materials were bought on a large scale and sold at a shop on the site. The houses had to conform to certain plans provided by the D.D.F. The only liberty the owner could allow himself was to put on a second floor if he wished. At the center of the project were various shops such as plumber shops, lumber yard, electrician and qualified hands were always available either for advice or help if necessary. Every week a building inspector would come around verifying

whether the resident was following the specifications. The resident could either build his house alone or hire some other people to help. Most residents hired professionals. Most of the lots have been allocated but because the program has been discontinued, many of the houses are still in a semi-finished state. Pict. 6 shows a house into its first stage. Pict. 7, 8, 11 are more or less successive stages of houses in construction. A lot of confusion exists on the site because of the lack of supervision. It comes mostly from the fact that people who started building under the mutual help program are now totally on their own. The most pressing problem, according to an engineer on the site was getting cheap material. All around the site there are small makeshift factories turning out quality bricks. The situation is even more confusing now that big chunks of land have been sold to unions. Big engineering firms like UMAC have taken over and have started building on a mass scale. The unions are building these houses with loans from banks. This particular section was financed and supervised by the Banco Nacional de Mexico. The individuals pay the banks back by installments. (In Unidad de San Juan the residents paid the D.D.F.).

## 2) Evaluation

A) Shortcomings- The shortcomings are obvious; one would be tempted to think that because it is a self-help program, the residents would have more freedom. The truth is that in its basic form the program offers him even less freedom.

The size of his lot is determined in advance to the near inch, the shape of his house, as well as the design has been decided by an architect, and even the construction method is laid out for him. His only alternative is to build the house wrong and fight with the inspector who will be more or less lenient. Some of the houses were constructed in a very professional way, others were of doubtful quality to say the least. For instance brick laying (as seen in pict 10) is not entirely up to par. Some of the responsibility must go to the D.D.F. Utilities are not functioning correctly. Water still has to be brought in barrels (pict. L4). Many sites are still left to cattle (pic10).

B) Advantages - Yet despite all those disadvantages, there are definitely some very good points. It is true at first, that the site looks disorganized and more like a squatter settlement, however, there is a certain feeling of freedom and joyous activity which is lacking in the San Juan project. The houses, despite all the restriction, manage to look different. Something like the wall in pict 11 is gay and original. There are more people in the street, more going on. The lack of official control has helped little commercial ventures. Streets look more like normal Mexican City streets with smelly tacos stands and auto mechanic shops. So from a sociological standpoint, it is certainly a success.

#### 5) Conclusion

Both Unidad San Juan and the mutual help programs can be called relative successes. Generally, people



are happy but not because they are satisfied with their neighborhood or their house but because they have a house. They are satisfied because of the good community services that the government has provided. Some technical innovations were used such as prefabricating part of the walls and windows in the type B house or some plumbing fixtures. Improvements have been made on the mutual help program. Valuable experience has been gained. But myriads of problems have not even been tackled. Houses are too expensive in Unidad San Juan. Monotony is a dreadful trademark of the project. Carelessness from the planners who supposedly "organized their own programme of research on building parts and methods in order to plan for minimum costs construction"<sup>11</sup> can be seen everywhere. In the self-help program, excessive supervision has gone against the principle of self-help and destroyed its advantages. But lessons are learned. One can see that from this type of project valuable experience can be gained for the future.

11. Frieden - page 91

CHAPTER III    STRUCTURE OF NEEDS    1

The process of determining a structure of needs for people to be housed is a process that every planner goes through (or at least should go through) before making particular policy recommendations. This work is an exercise in humility for the planners and the architects because it involves listening and understanding, none of which is the easiest thing to do, especially if you are already an established expert in the field.

1) Preliminary Studies

The first thing to determine is who we are trying to help. Even if we listen correctly, if we listen to the wrong sources, our results will be inappropriate for whoever we are dealing with. Classification is always an academic exercise and does not reflect real situations, but in this case, the low-income strata of Mexico City population to be housed, separating various groups is necessary, because these groups have different aspirations and needs.

1. (This chapter is the result of personal evaluation of the urban housing situation in Mexico City and elsewhere, of personal belief and ideas as well as findings of various experts such as from John Turner and Charles Abrams. My views may be distorted by utopia and just plain ignorance but as one once said: "A little madness is necessary sometimes.")

It is obvious that income is an important determinant. We have seen that 41.1% of the total population has an income of less than 1000 pesos but this portion of the population does not have the same aspirations. They differ by their background and also by their length of time they have lived in the metropolitan area. We could distinguish among:

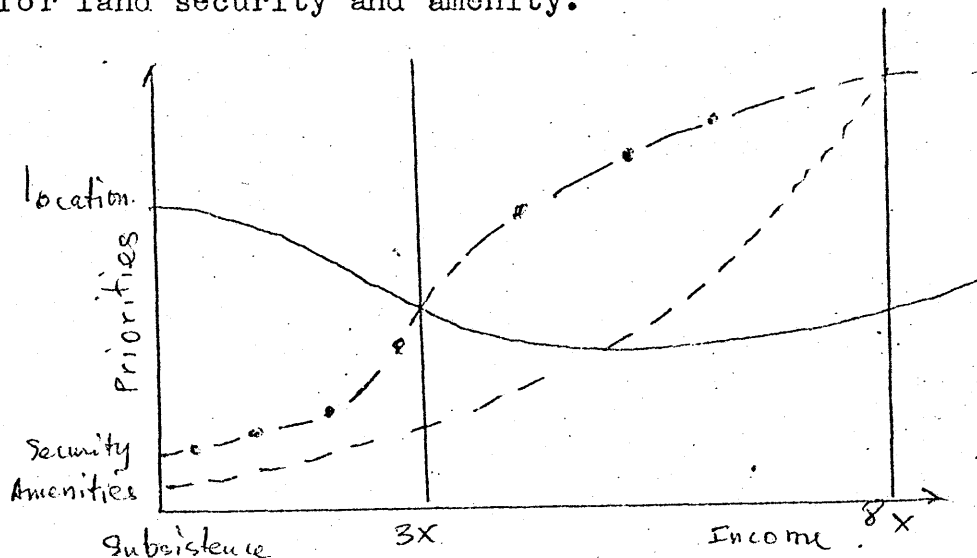
- a) Direct immigrants from the rural country.
- b) Immigrants from smaller cities.
- c) Former tugurios dwellers, displaced by urban renewal or who moved of their own choice.
- d) Former "Jacales" dwellers.
- e) Former Colonias dwellers.
- f) Campesinos from the Cerros de La Villa.

Each type has different needs and requirements. The priorities are different, because their styles of life are different. The planners are then faced with a set of decisions to make. Should they build a housing project solely for one group or for a mixture of various groups. Indian families would rather stay together and maintain a certain lifestyle and friendship network. Sociologists would argue that a melting pot ideal is what housing projects should achieve; both arguments are defensible. This question is to my eyes very important because it spells the difference between trying to solve a particular housing problem or solving the housing problem for the metropolis. The planning on the whole metropolitan scale and not by particular projects

would then open the way for more freedom for the individual to choose where and in what conditions to live. The emphasis is then on adaptability and flexibility. A housing program has to fit all the various requirements. Therefore, this preliminary study gives the boundaries between which we can move.

2) Immediate Requirements

John Turner 1 has outlined three priorities: 1) location, 2) land tenure and security, 3) amenity; for immigrants. Those seem obvious now and have been widely accepted. Location or rather access to opportunity (which could be proximity to potential job or to center of city where jobs can be found) is the first priority. Then as his income rises so does the need for land security and amenity.



1. Turner, John C: "Barriers & Channels for Housing Development in Modernizing Countries" - Journal of the American Institute of Planners - May '67 pg. 167-181

This analysis, however, only reflects the attitude of in-migrants, which we have seen only represents a small percentage of the people to be housed in Mexico City. The other factor, namely their background seems essential in determining the priorities. It seems, for instance, that people who used to live in downtown Tugurios have a higher amenity requirement than those who came from Colonias. Inversely, former Colonias residents have a higher land security priority than the Tuguruis residents, who were used to renting. In other words, if we want the Turner diagram to apply here another dimension has to be added.

Any housing scheme in Mexico City has to offer at least:

- 1) Land that can be bought at a low price.  
This is the most important investment for the residents.
- 2) Access to opportunity.
  - a) It has to be near their jobs-
  - b) Or has to offer adequate transportation to them.

A job is what makes the house possible. But security in jobs is hypothetical so the resident must be able to wheel-and-deal also. The kids, shoe-shiners and pan handlers have to be able to go to work too. All this indicates the necessity for a site close to the center.

- 3) Provisions for absolute minimum amenities to the house, embryonic sewage system, water and roads.

Those are the absolute minimum requirements that no housing scheme can escape. The philosophy behind the entire expose is that, because

- Financially, a sponsoring agency cannot satisfy all the requirements for all the groups
- People can and want to determine their own environment,

the only solution is to satisfy the minimum requirements and then give the people the means of achieving all of the other requirements by themselves. Instead of substituting quality for quantity, like most previous projects, we can have quantity plus minimum standards of quality. The program has to offer an enormous potential for flexibility, adaptability and diversity. For not only does it have to accommodate very low income people, whose jobs fluctuate and who needs maneuverability but also higher income residents, who are making a sizable investment.

### 3) Long-Range Requirements

This break-down is in fact arbitrary and somewhat misleading. Other aspects of their socio-economic environment could be classified as immediate needs. In fact, as Lisa Peattie points out there is no such thing as a "housing problem" per se. The whole issue is tied to the broader problem of "deploying resources to handle a given situation in

life". Consequently, "immediate requirements" also could include all the factors that contribute to this socio-economic security. But we will keep the classification for the sake of clarity.

According to the income level and background of the residents, additional needs play two different roles..

- 1) People who move from other types of housing need an incentive to offset the undoubtedly higher rents (for the title to the land). As seen in San Juan, people move because of the attraction of better community services and better housing conditions.
- 2) Would-be squatters have to be offered means of "consolidating their grip on the system" (L. Peattie) after they acquired title to the land, and also incentives to increase their environmental security. The range between these two is considerable for no single group has the same aspirations. However, these broad categories enclose most of the general demands.

These two "roles" can be translated into specific needs.

Let us start with the second category. Consolidating one's grip on the system involves integrating oneself into the present system and giving the means to the next generation to be on a level above the unskilled. This involves education...

- a) Trade-schools, or on-the-job training. House

construction can for instance be and opportunity to break into the construction job market.

- b) Schools: Primary, secondary schools as well as libraries and such.

The need for upward mobility through education is one of the primary requirements for low-income people. This is what they will be looking forward to in choosing where to live.

Increasing environmental security can be achieved in several ways.

- a) By maintaining the support of family or friendship network. This is how mutual help is made possible, let it be for building a house or fixing a car. It is an absolute necessity as well as a money saving situation, This would involve a new process of resident selection for a housing project. Maybe an ideal process would be no selection at all, so that close relatives and friends could live in a clustered way on adjacent plots of land.
- b) Building your own home. This process, as described by J. Turner 3 would involve increasing the housing input. Input which consists of...

-Financial capital



-Savings out of income

-Building and administrative skills

-Initiative and spare time

The more you invest in your home, the more you feel secure. This brings the whole issue of self-help housing, which we will talk about later.

- c) Opening a small business. Even a taco stand can in a small way, increase your income and therefore your security. Whenever possible, this practice should be encouraged. Another practice which is common and much sought after is rental of rooms or part of the house. This too should be encouraged.

The second category of needs would apply to the already more or less "secure" portion of the residents...

- a) Community services. As we noticed in San Juan utilities and community services are the main attracting powers for residents. The proximity, availability and variety of services determines whenever one makes the decision to move up to higher rents and feels satisfied by the move. We could classify these needs in:

- 1) Public utilities. After the minimum requirement of part 1, the residents feel that they need, better roads, sewage system,

garbage collection and the demand for these will increase.

- 2) Market and related activities
- 3) Hospitals, nursing homes....
- 4) Community centers such as the one in Unidad
- 5) Sports facilities
- 6) Parks and other recreational areas.

These needs have to be fulfilled in a fairly rapid way.

c b) Housing requirement. We finally come to the house itself. The criterias for houses are traditionally not the highest because houses are considered secondary to the rest of the socio-economic background we have talked about so far. Indeed, during the interviews in San Juan, there were few comments about the house in particular. This may come from the fact that it is really secondary. But it is my conviction that in the long run, housing conditions influence the whole environment and give a direction to a style of life. The opportunity has to be given to the resident to decide for himself. a housing scheme will have to answer the following needs...

- 1) low cost construction. People with income under a 1000 pesos who already invested in land cannot afford to spend a regular part

of their salary for the house. However, Mexicans have the resourcefulness demonstrated in Colonias to build cheaper and faster than regular housing project.

aa) Mutual help. The housing scheme should offer the possibility for mutual help, but it cannot enforce it. Self-help in many cases just takes too much time from the owner and diminishes his potential for other activities. Also, some families do not have the necessary labor to contemplate self-help housing.

bb) The use of indigenous material is not as much a factor in the metropolitan area than in the semi-urban areas. However, the cost reduction in transportation should stimulate interest in small on the site factories for bricks and cinder blocks.

cc) Rapid assembly. This criteria is more squatter oriented, but it also applies to people who used to rent, for a house marks the "transition from the bridge header to the consolidation phase of his statement" 4. It also reduces the

waiting period between buying the land and living on it.

2) Flexibility. This is the primary requirement in our housing scheme. What we are trying to do is build an environment which can grow organically, directed by the people. This is the only way to achieve a balanced neighborhood. The houses then have to accommodate people from all backgrounds and income levels.

aa) Income. The system should be suitable for a broad range of financial capacities, from would-be squatters, who would build it entirely by themselves to more wealthy people who could have it built.

bb) Physical flexibility. The system should be flexible enough for various needs. Such as-

-Size and composition of family therefore of house.

-Room requirement

-Height requirement, if for the family <sup>instance</sup> cannot afford a big lot, they should be able to built the house vertically.

-Light & sun requirement. It should have an inherent potential for con-

version and reconversion.

-It should allow for freedom of location of house on the lot.

3) Structural basis. This type of system can produce a type of house which might deteriorate quickly into slums. The system should assure at least structural integrity. This way, even if in the future conditions improve materially he has the guarantee that at least structurally his house is sound and he can upgrade it.

4) Expandability and upgradeability. The main requirement as we have seen in San Juan is space. As the family grows (or shrinks in size for that matter) The house has to grow also. Additions should be possible in a very simple way. Squatters could start with one room and then expand either vertically or horizontally. In the case of material improvement, as we already said there should be considerable provisions for upgradeability.

5) Indigenous criterias-

aa) Design. The resident should have complete control over his design. No attempt should be made to impose upon him a specific size, shape or lay-out. The absence of public controls will bring

out "a vital and optimistic sense of direct, independant manipulation of the immediate living environment" 6. The problem of monotony that we <sup>noticed elsewhere</sup> will surely not appear. The residents will know instinctively how to group themselves by friendship or kindship groups instead of relying on the sociologists.

CONCLUSION of CHAPTER III

Such are the basic needs, sociologically and urbanistically, of the low-income population of Mexico City. Some of the needs are immediate. The necessities of proximity to the center, land ownership and basic amenities cannot, in my mind be done without. Other types of needs are maybe not as pressing chronologically, but they are just as important. Architecturally, the system we are looking for should be structurally sound and should possess great flexibility. But the urbanistic as well as the design problems should be solved by the residents themselves. Armed with these criterias, I shall try attempt to offer some solutions to the problems.

6. Ian Turner & R. Hertz- Arch. Design Magazine - Aug '68

CHAPTER IV

This chapter does not pretend to offer any revolutionary solutions that will instantly solve any housing problems Mexico City might have. Therefore, it is not an expose of a new housing policy, but these are merely some thoughts about how one could go about it if one wanted to solve some of the problems. Of course, we have to disregard all political aspects of real estate operations which automatically eliminate these proposals as absolute policy decisions. In real life, lobbying, bribing, political pressure would probably decide more than convictions.

We will only attach ourselves to a few areas:

- 1) Financing low-cost land acquisition and sale in Mexico City.
- 2) Devising another method of payment other than the monthly mortgage.
- 3) Community control of all services.
- 4) Review of different systems
- 5) A tentative design ( if I were the resident).

1) Financing Low Cost Land Aquisition

Land, being the most important factor, both for its high monetary value and its sociological significance, should get prime attention.

We are exclusively dealing with low-income people (income inferior to a 1000 pesos) who therefore can pay a maximum of about 10% of their income to housing. They comprise 51.7% of the families in the D.F. 1 . A 100 pesos seem to be a reasonable figure. The average cost of a house would then be about 18,000 pesos, for 180 installments. This off-hand eliminates most of the people we are dealing with from usual bank mortgages. Most of them are considered too bad a credit risk. This automatically eliminates them from the benefits of F.O.V.I. (Fondo de Operacion Y Descuento a la Vivienda) which are trust funds supposedly intended for "social interest housing". The limit of 3000 pesos indicates that these funds will mainly benefit the middle-class.2

1. See chart # 8

2. For a detailed expose, see Oldman page 171-173



A private development like Aurora, offers lots (153 m<sup>2</sup>) at a price averaging 18,000 pesos, on a 7 $\frac{1}{2}$  installment contract. These lots are semi-urbanized with guarantee of urbanization. The prices are about the lowest in the urbanized metropolitan area, however, land payments are about 200 pesos a month and the average family income is 1000 pesos which does not leave much for the house itself. Clearly, the only likely sponsor is the D.F. itself, which can acquire land much more cheaply than private developers.

a) Availability of land. Government Ejido regulations have restricted the use of Ejido land for residential or industrial use. As Oldman points out, in order to integrate Ejidos in the D.F. land use planning, regulations controlling transfer and use of Ejido land must be modified. A survey and a detailed map listing all governmental, institutional and Ejido lands, satisfying the low-cost, close-to-center requirement should be compiled. Ejido land on the southern fringe of the D.F. have long been eyed upon.

b) Appropriating the land. 3

-The D.F. may acquire development rights in this land. It then can acquire full title by purchasing ownership for a price equal to the capitalized value of current income. In a lot of cases, the latter is minimal compared to the real value of the land.

-The D.D.F. can acquire large parts of the land outside of the metropolitan area through eminent domain proceedings. The creation of improvement of population centers has been recognized as a valid public purpose for expropriating Ejido land. This can be enforced. A land bank can then be created to dispose of this acquired land for low-income housing.

## 2) Devising New Method of Payment

Considering the fluctuating nature of income for a lot of residents, a form of payment which is not rigorously monthly should be investigated. Groups of neighbors could get together and form a sort of "cajas populares". "Cajas" are mainly credit unions which hand out small loans for purposes such as home-improvement, bills, ..ect. Such a "caja" could take charge

of the land payments in dealing directly with government agencies. In the meantime residents could arrange a payment schedule suitable for them thus avoiding the woes of defaulting, eviction and loss of their property through repossession. These "cajas" would need official help at the beginning, but well managed, they could even grow and become full-fledged credit unions, through which members could obtain small loans, to finance either the construction of their house or its improvement. Being in effect self-managed, such a credit union would reduce delinquencies in payment as well as provide financial flexibility to its members.

### 3) Examples of prefabricated systems

The requirements of the residents have been listed above. The basic features are structural soundness, low-cost, potential for self-help and overall flexibility. The first three characteristics would indicate a prefabricated structural system. "Core prefabrication and core design are frontiers for research but by 1964, research had hardly begun" said Charles Abrams.<sup>4</sup>

4. Ch. Abrams: Man's Struggle for Shelter in an Urbanizing World, p.178

In 1971, research has started to be done in those areas. And there are a few interesting systems, but most of them suffer from two facts:

a) Most are square box systems without flexibility. Even the structural systems suffer from the monotonous repetition of box frames.

b) All of them are capital intensive instead of labor intensive. This is not as bad in Mexico as in some other less developed areas of the world. The manufacturing plant could be set in the area of the housing project and could be a source of employment for new migrants and the jobless. It is a good way to break into the construction job market.

We will evaluate the Mitchell Framing Systems..... PLAN III

This is to my knowledge the only system satisfying the requirements.

3) The Mitchell system. 5. This system is based on prefabricated, lightweight structural components, made of precast cellular concrete members. The four components are: a column, a cantilever beam, a tie beam and a slab (see

5. See Ternor & Hertz : Squatter Inspired Adm. Aug '68

### BASIC COMPONENTS

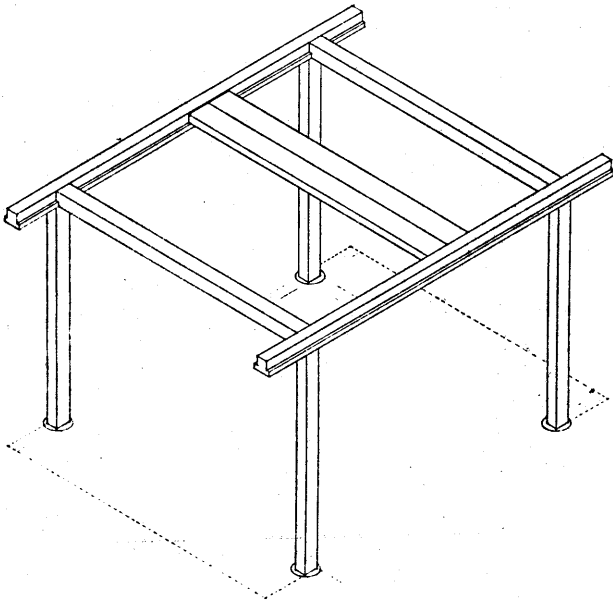


FIGURE 4

The system consists of four reinforced precast concrete components: a column, a cantilever beam, a tie beam, and a roof/floor slab. The components are erected on concrete footings to form a 3-meter by 3-meter structural bay. The 3-meter span may be enlarged up to 4-1/2 meters if desired.

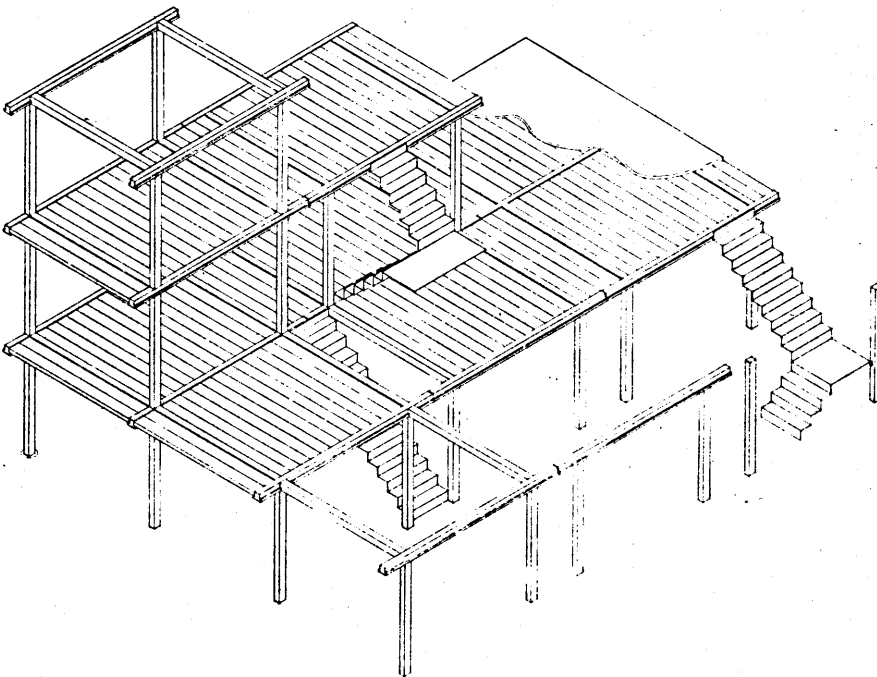


FIGURE 5

The bays may be laid out in any pattern along the ground and stacked to a maximum height of four stories. The frame is so designed that its structural integrity is enhanced by the horizontal and vertical addition of bays.

picture III ). The dimension of a bay is 3 X 3 m.

Erection:

Can be done by a contractor or by the resident himself. Each component weighs less than 70 kg. The footings for the columns are drilled and poured by a construction team. The first frame can then be set in 15 min.

Structural

The system is safe and can withstand winds

Soundness :

and seismic tremors. The structure can support up to four stories which is about the maximum height of a single family house.

Flexibility:

The system is flexible because it only determines the structure. The sizes of room can be decided by the resident.

It allows for both horizontal and vertical expansions. It is flexible because the walls are only an environmental barrier thus could be of any indigenous material. It can be temporary; as income grows the walls and thus the physical outlook can be improved. Research has been done to develop subsystems, such as roofing and plumbing. Like the framing, the plumbing package represents a minimal initial cost with capacity to expand.

Indigenous Criterias

The resident can plan the design and expansion of his house by himself. It will take only a few attempts for the resident to understand the potential of the system.

Criticim :

-It is as we said, capital intensive at the start.

-It does not have the "floatability" necessary in Mexico City.

-It can only be built successfully on level ground.

-The houses still maintain a box-like appearance. All the angles are right-angles.

However, this system with a few improvements taken from other systems could well provide most of the answers to the housing problems in Mexico City. The cost of the framing is less than \$2.25 per square foot. As far as the slab is concerned, it would borrow the cast-in -place floor slab of the José Novoa system 6 . The columns can be connected to that slab. This kind of the system is a step toward implementing the structure of needs we have devised. It offers enough flexibility to channel the resident's resourcefulness and determination, at the same time, enough control is assured so that the houses do not turn into instant slums. "If the potential squatter is offered a program whereby he has a chance to acquire secure land tenure coupled with an immediate minimum shelter, and the ultimate and reasonable hope of entirely adequate housing, the scheme stands

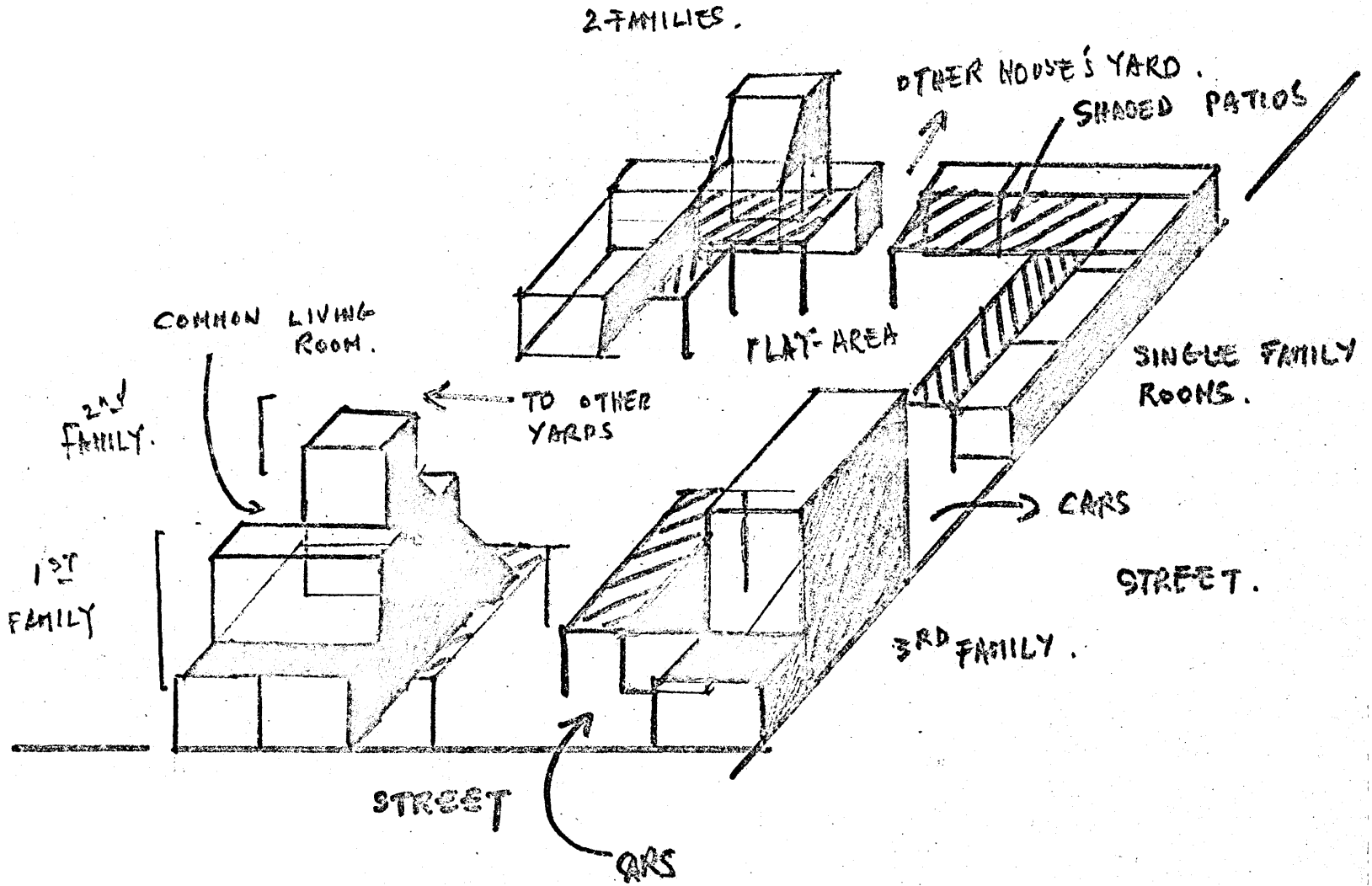
6. See Concrete Trends, Special Report T-21 page 6

a vastly better chance of succeeding than the futile legislation and exercise of police power that has characterized land control efforts to date" 7.

\* As a conclusion, we offer a possible configuration for a cluster of houses that a group of families, linked by family or friendship ties could build around a central yard. These types of groupings will probably be favored by the residents who thus keep intact the traditional ties. This configuration could mean saving of land and money but it still offers the benefits of a large yard. Families with higher income could buy more land. Residents can experiment in this type of arrangement thus creating an environment where they can feel comfortable.

7. Mitchell & Turner: Squatter Housing: Criteria for Developo,  
Directions for Policy - page 22





One such possible configuration of houses built around a central yard. However, only the residents themselves could determine their physical environment.

TABLE I

## ABSOLUTE AND RELATIVE RATES OF GROWTH FOR MEXICO CITY, 1930-1990

<u>Year</u>	<u>Absolute Population</u>	<u>Relative Population</u>
1930	1.6 million	9.8 per cent
1940	2.3 million	11.3 per cent
1950	3.6 million	14.0 per cent
1960	5.8 million	16.6 per cent
1990	13.5 million	19.0 per cent

SOURCE: Secretaria de Recursos Hidraulicos, Comision Hidrologica de la Cuenca del Valle de Mexico, El Desarrollo Economico del Valle de Mexico y la Zona Metropolitana de la Ciudad de Mexico, July 1964, Charts III-7 and III-16.

Source: Hrth-Deneke: The Colonias Proletarias, p.212

TABLE I-B

## MORTALITY AND BIRTH RATES FOR MEXICO, 1922-1959

<u>Period</u>	<u>Number of Births per 1,000</u>	<u>Number of Deaths per 1,000</u>	<u>Population Growth Rate<sup>b</sup></u>
1922-29	32.6	25.4	
1930-34	44.6	25.6	1.6
1935-39	43.5	23.3	
1940-44	44.6	22.2	
1945-49	45.0	18.0	2.7
1950-54	45.1	16.5	2.9
1955-59	46.0	12.6	3.1

SOURCES: Julio Duran Oshea, "La Explosión Demográfica" in México: 50 Años de Revolución, Vol. 2, pp. 7-8; (b) p. 4.

TABLE III-3

## GROWTH OF THE COLONIAS PROLETARIAS FROM 1935 TO 1970: LAND AREA AND POPULATION AS PER CENT OF CONTIGUOUS METROPOLITAN AREA

Year	Land Area in Hectares	Per Cent of Total Urban Land Area in Colonias	Population	Per Cent of Ur- ban Population in Colonias
1930	$\frac{1,700\text{ha (c)}}{8,600\text{ha (b)}} =$	(20.0)	$\frac{?}{1,230,000 (b)}$	
1940	$\frac{4,500\text{ha (c)}}{(21,750\text{ha})} =$	(21.0)	$\frac{?}{1,760,000 (b)}$	
1950	$\frac{6,600\text{ha (c)}}{24,000\text{ha (d)}} =$	(24.0)	$\frac{420,000 (c)}{2,950,000 (b)} =$	14.0
1955	$\frac{7,700\text{ha (e)}}{(27,600\text{ha})} =$	30.0 (e)	$\frac{750,000 (c)}{3,750,000 (b)} =$	(20.0)
1960	$\frac{16,300\text{ha (f)}}{47,000\text{ha (g)}} =$	(35.0)	$\frac{1,500,000 (f)}{4,145,000 (e)} =$	(30.0)
1970	$\frac{24,000\text{ha (e)}}{63,000\text{ha (m)}} =$	(40.0)	$\frac{(3,110,000)}{7,734,000 (l)} =$	40.0 (d)
1990	$\frac{?}{87,72\text{ha (n)}} =$	?	$\frac{?}{12,281,000 (m)} =$	?

SOURCES: See following page

? = data not available

( ) = approximated or derived from equation

Source: Harth-Deneke: The Colonias Proletarias, p.217

TABLE I-10

PER CENT ECONOMICALLY ACTIVE POPULATION BY COLONIAS DISTRICTS  
AND SUB-METROPOLITAN AREAS: 1930-1960<sup>e</sup>

	<u>1930</u>	<u>1940</u>	<u>1950</u>	<u>1960</u>
CORE DISTRICTS <sup>(a)</sup>	<u>33.5</u>	<u>36.3</u>	<u>38.3</u>	<u>40.2</u>
COLONIAS RING				
District I	37.5	33.2	34.1	33.2
District XII	... <sup>(b)</sup>	30.7	35.1	38.3
Atzacapozalco	28.4	30.7	32.5	33.3
G.A. Madero	... <sup>(b)</sup>	31.0	32.3	32.3
Ixtacalco	30.8	32.0	32.3	32.4
SUB-TOTAL Colonias	<u>35.3</u>	<u>34.2</u>	<u>33.6</u>	<u>33.8</u>
FOUR DISTRICTS <sup>(c)</sup>	<u>31.4</u>	<u>29.8</u>	<u>32.1</u>	<u>30.6</u>
THREE DISTRICTS <sup>(c)</sup>	<u>12.5<sup>(d)</sup></u>	<u>22.8</u>	<u>21.1</u>	<u>21.9</u>
TOTAL:	<u>33.9</u>	<u>34.7</u>	<u>35.3</u>	<u>34.5</u>
MEXICO	31.1	29.8	32.4	32.5

SOURCES: Derived from VIII Censo, op. cit., Vols. 1 and 3, and Resumen General, op. cit. (for national data), Table I, 1960.

- a) Equal to "Ciudad de Mexico," except for Districts I and XII.  
 b) Data not reported for this decade in this municipality.  
 c) Includes urban and rural population; economically active data not available for "urban only" category.  
 d) This figure is low but this is the precise proportion reported.  
 e) In 1960, the economically active population had as its lower limit 8 years; prior to this the lower limit was 12 years. This, however, is not evident in the data between 1950 and 1960 as would be expected; e.g., for some districts the proportion declined, rather than rose.

Source: Harth-Denecke: The Colonias Proletarias, p. 244

TABLE VII-1

RENT PAID FOR HOUSING IN COLONIAS PROLETARIAS, TUGURIOS,  
FEDERAL DISTRICT, AND URBAN MEXICO: 1957, 1960

<u>Rent in Mexican Pesos</u>	<u>Colonias Proletarias</u>	<u>Tugurios</u>	<u>Federal District</u>	<u>Urban Mexico</u>
Up to 50	52.6	39.2	24.7	29.4
51 to 100	21.0	22.0	17.6	23.6
101 to 200	9.3	20.8	20.3	28.4
201 to 400	1.0	11.9	21.4	12.7
401 and over	.5	.5	15.8	5.9
Squatters	4.4	...	...	...
Don't know	<u>11.2</u>	<u>5.7</u>	<u>...</u>	<u>...</u>
	100.0	100.1	99.8	100.0

SOURCES: I.N.V., Colonias op. cit., Table on p. 41 (unnumbered); I.N.V., Herradura de Tugurios, op. cit. Table on p. 65 (unnumbered); I.N.V., Investigacion Nacional op. cit., Table 3, p. 240, and Table 3, p. 212.

NOTES: A Mexican Peso is approximately US\$.08, or a US\$ is equal to M\$12.50. The proportion reported paying under M\$50 in the 1962 I.M.S.S. study was 13 per cent rather than 24.7 as presented above for the Federal District; the proportion of paying from M\$50 to 150 was 36 per cent. (in Correo Economico, No. 26-9, Year II, January 3, 1965, p. 61.)

Source: Harth-Denecke, The Colonias Proletarias, p. 252

TABLE VIII-3

PER CENT OF FAMILIES BY PROPORTION OF INCOME SPENT ON HOUSING  
AND BY DISTRICTS AND AGGREGATED MUNICIPALITIES, 1956

	<u>Per Cent Income on Housing</u>					TOTAL (a)
	0 to 10	11 to 20	21 to 30	31 to 50	Over 50	
<b>CORE DISTRICTS</b>						
I and IX	58.6	32.2	8.5	1.6	...	100.0
III, V, and VI	57.3	31.0	6.8	2.9	1.9	100.0
II and IV	45.3	35.9	17.2	1.6	...	100.0
XII	54.6	31.8	9.1	4.5	...	100.0
VII, VIII, X, and XI	46.5	32.8	17.9	7.7	...	100.0
MUNICIPALITIES	48.2	36.8	10.5	4.1	2.8	100.00
FEDERAL DISTRICT	<u>51.7</u>	<u>33.4</u>	<u>10.7</u>	<u>3.8</u>	<u>0.4</u>	<u>100.0</u>

SOURCE: Derived from Secretaría de Economía, Ingresos y Egresos, op. cit.,  
Tables p. 59. (Totals do not add because of rounding.)

Source: Harth-Denecke, *The Colonias Proletarias*, p.251

GLOSSARY

- COLONIAS PROLETARIAS: Squatter settlements in the outer urban belt, mostly north and east of the old city. Some of them have attained a legal status.
- TUGURIOS : Tenement houses found in the older part of the city.
- JACALES : Temporary shacks constructed of scrap or other salvaged materials, located in empty city lots or in fringe areas mainly in the State of Mexico
- D.D.F : Departamento del Distrito Federal
- Delegaciones : The twelve subdivisions of the D.D.F



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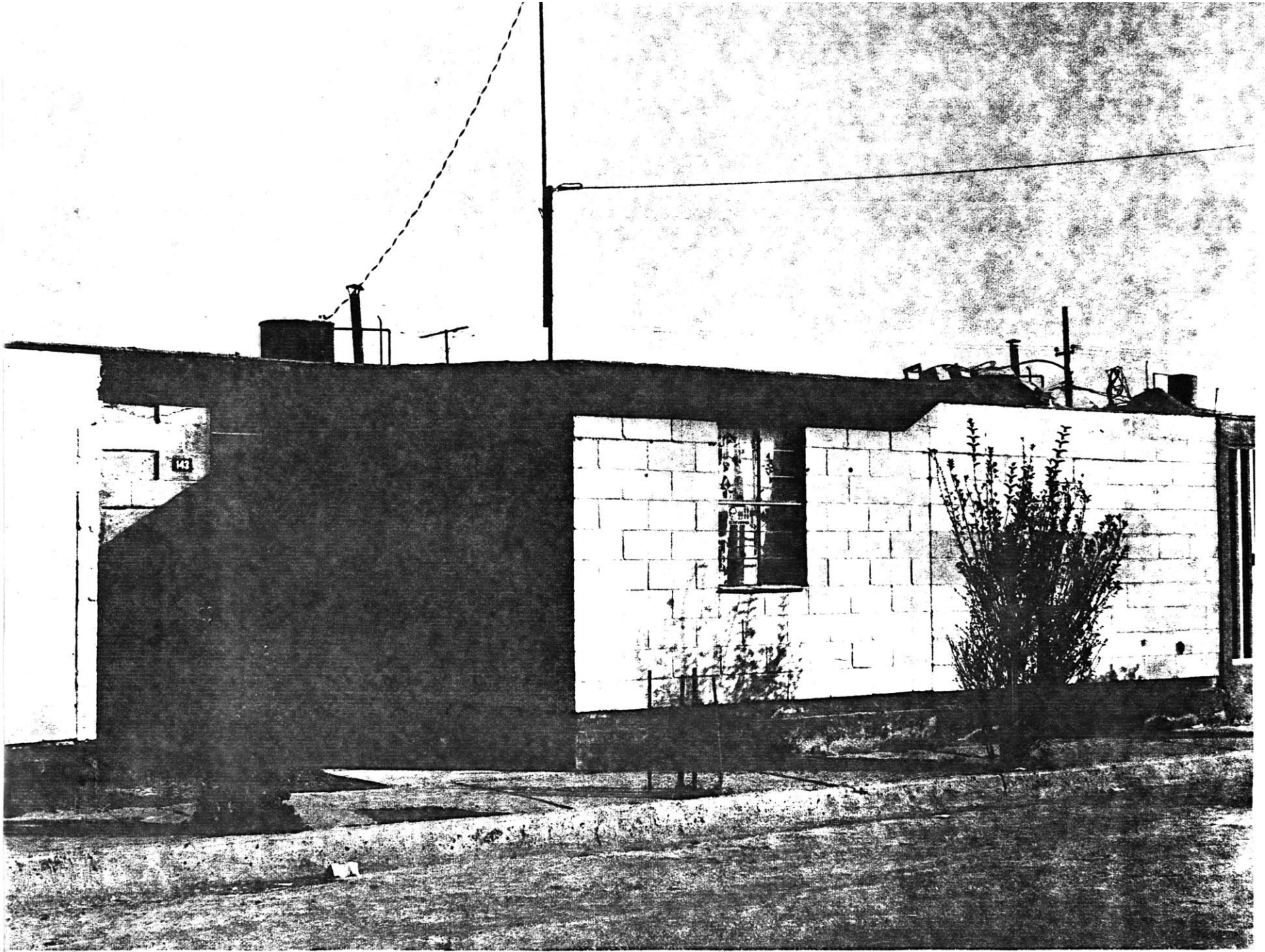
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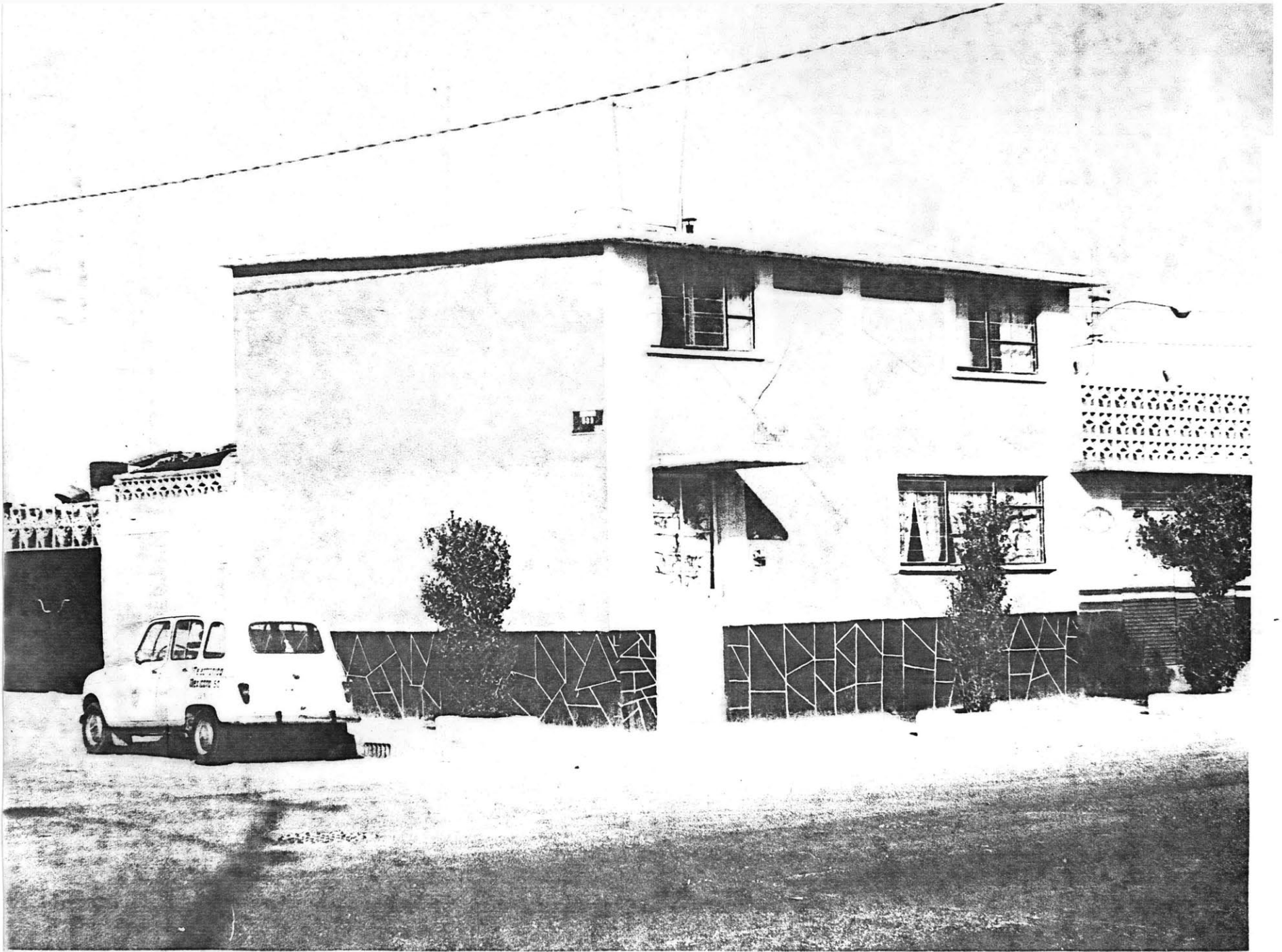


INTERSECTION OF AVENUE AND STREET IN SAN JUAN



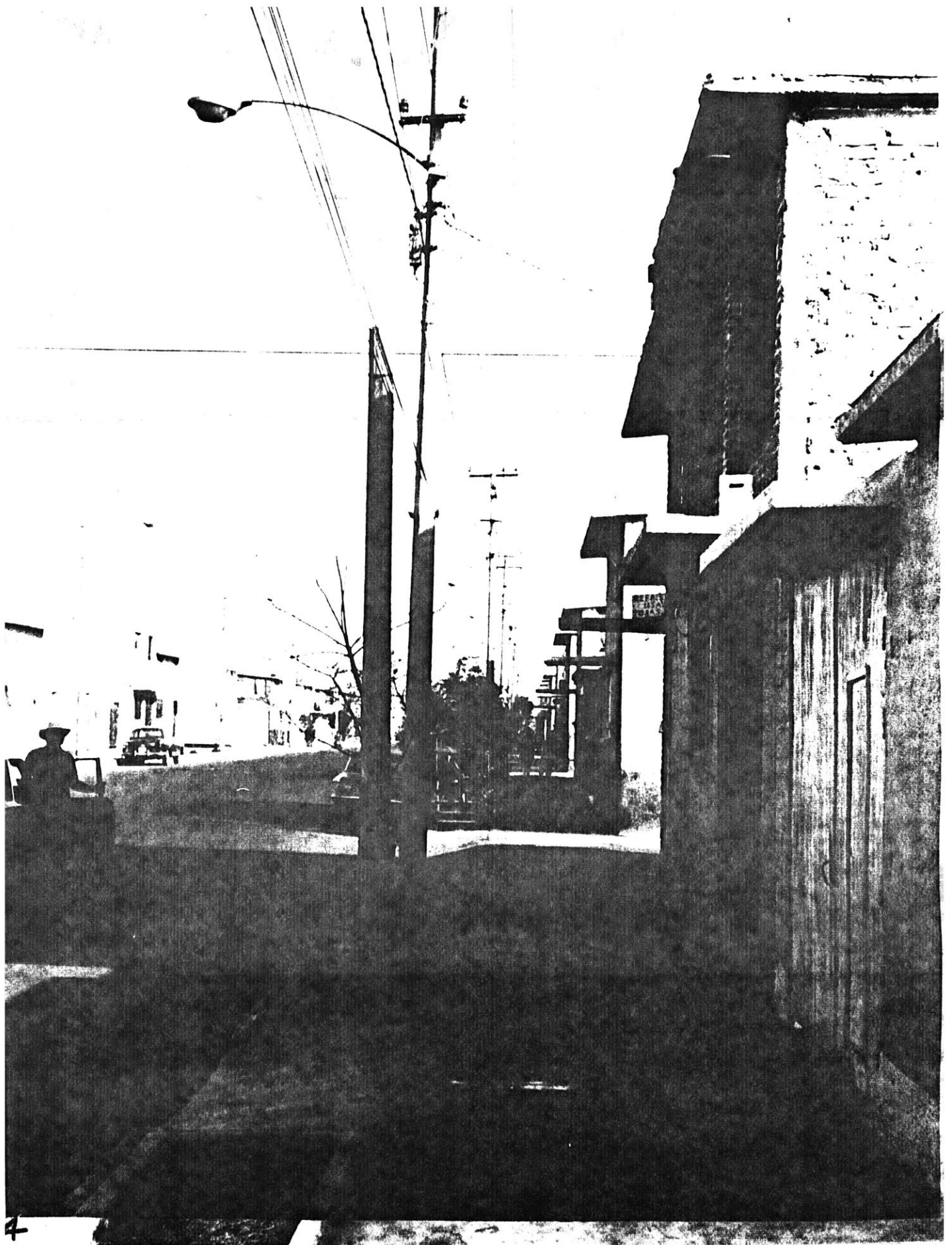
②

TYPE B HOUSE. THIS HOUSE IS IN ITS ORIGINAL STATE



3

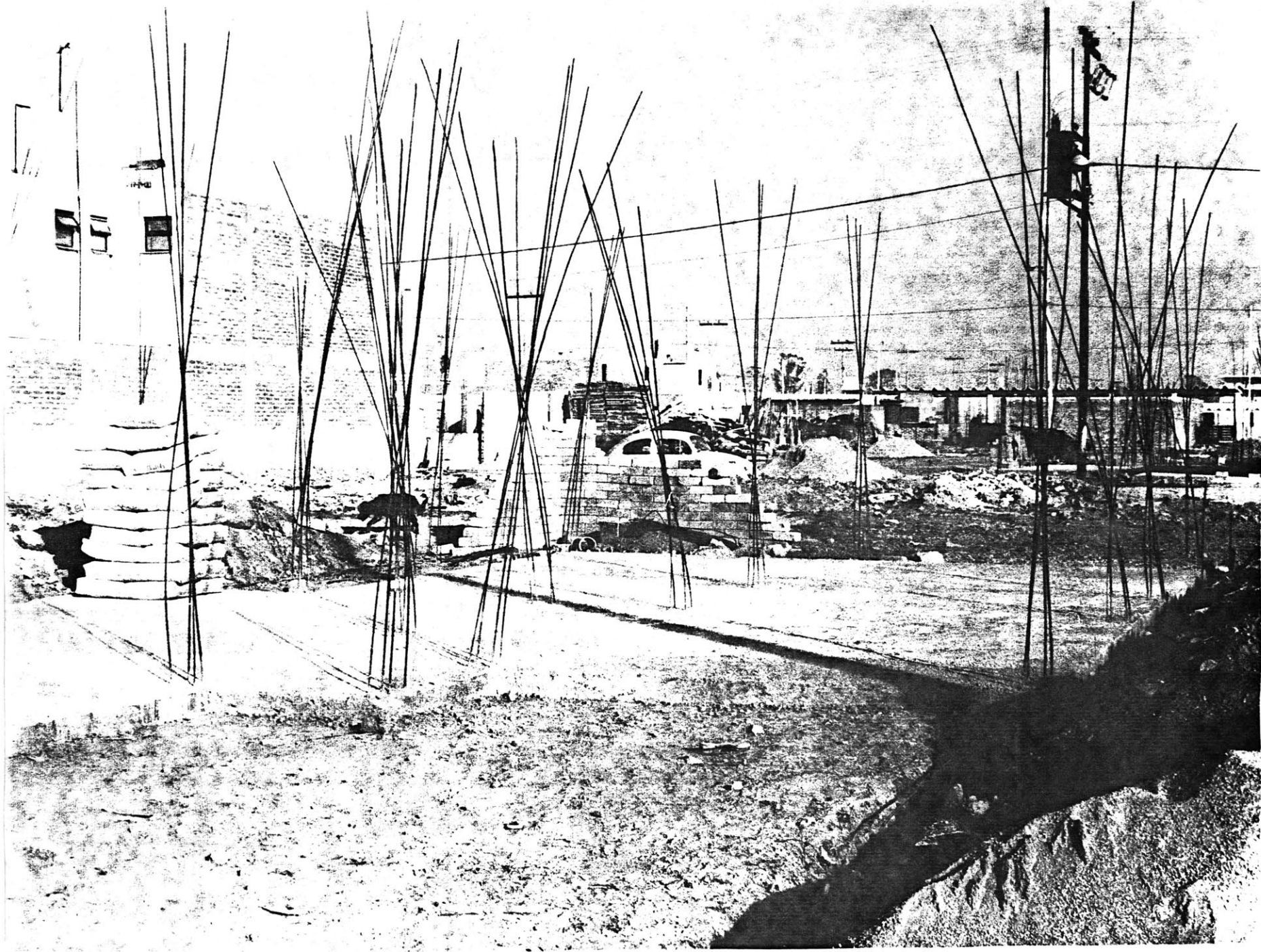
TYPE A HOUSE. THIS IS A MUCH IMPROVED VERSION



4  
VIEW OF AN AVENUE. NOTE THE MONOTONOUS ROW OF HOUSES

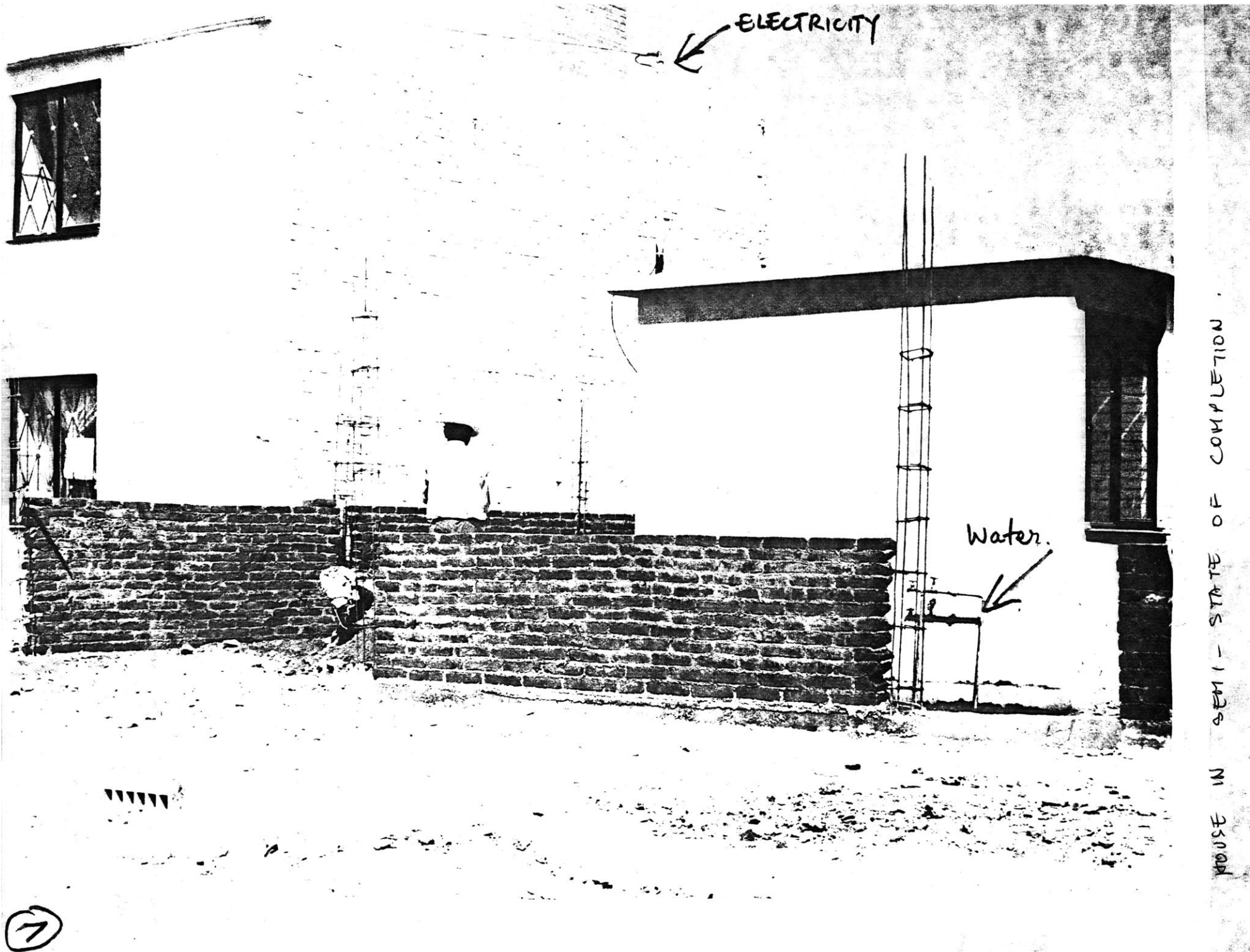
THIS TYPE OF IMPROVEMENT CAN BE SEEN EVERYWHERE





SELF-HELP PROGRAM. THIS IS THE BASIC STRUCTURE THE D.F. GIVES TO THE RESIDENT.



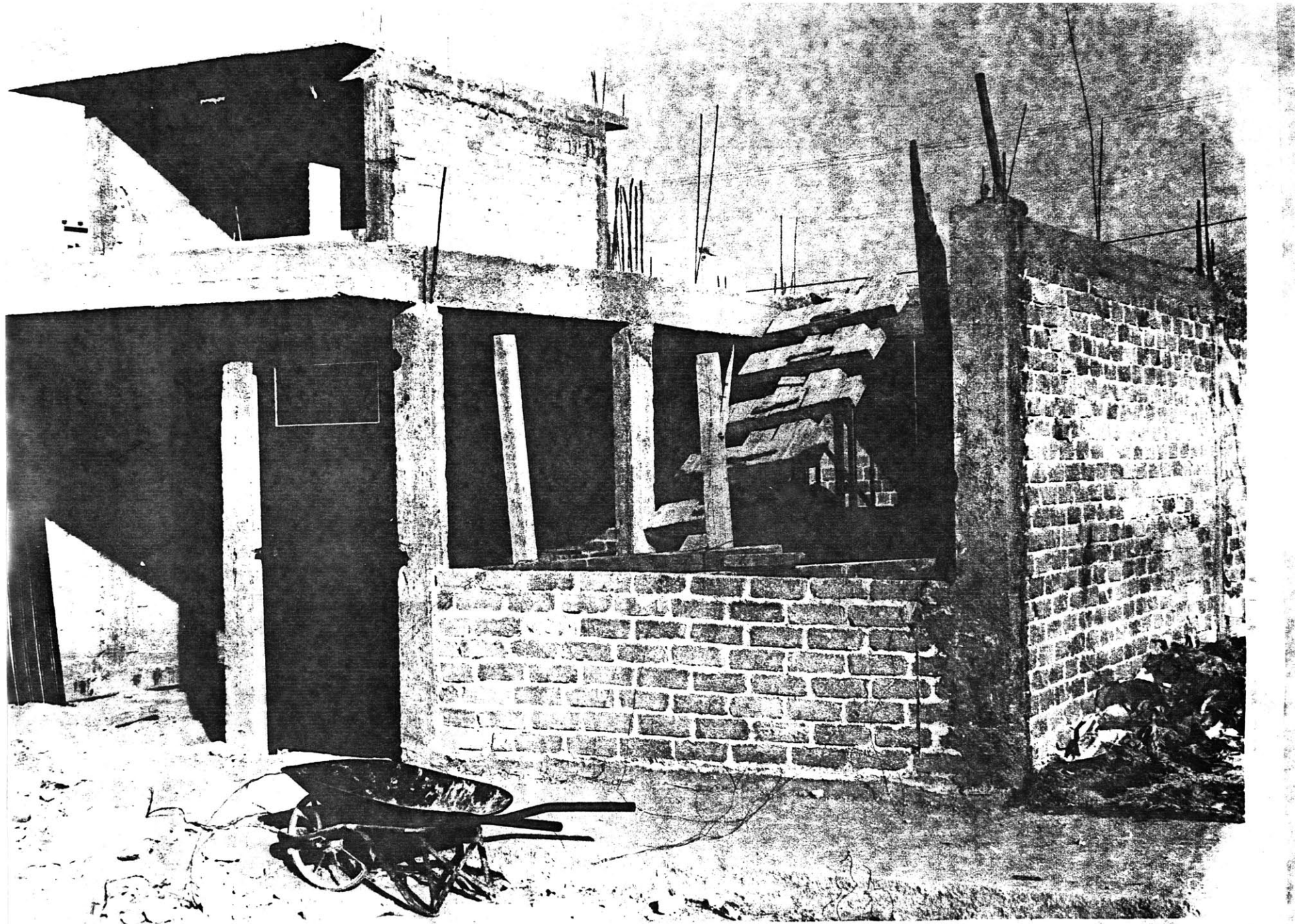


ELECTRICITY

Water.

HOUSE IN SEMI - STATE OF COMPLETION

7



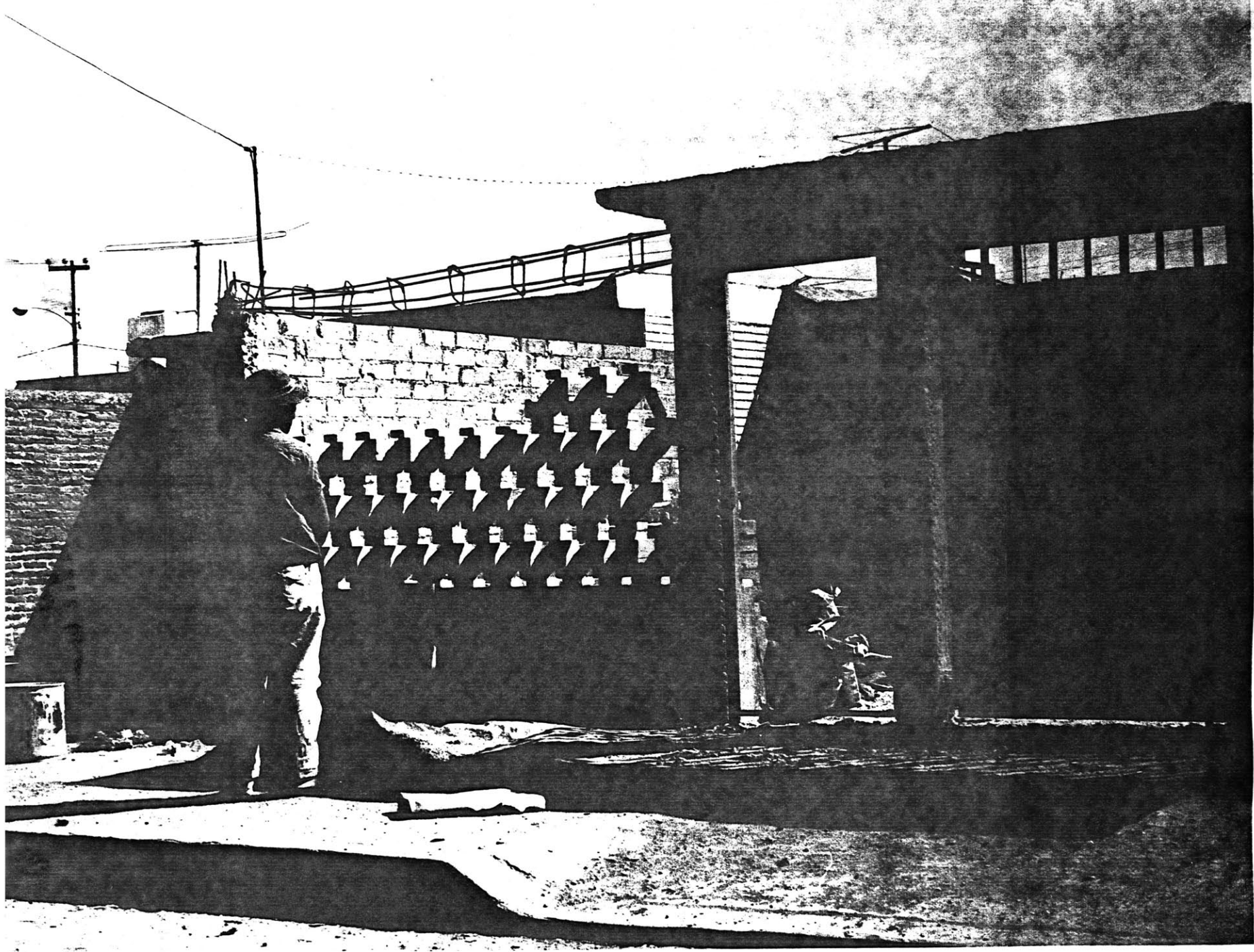
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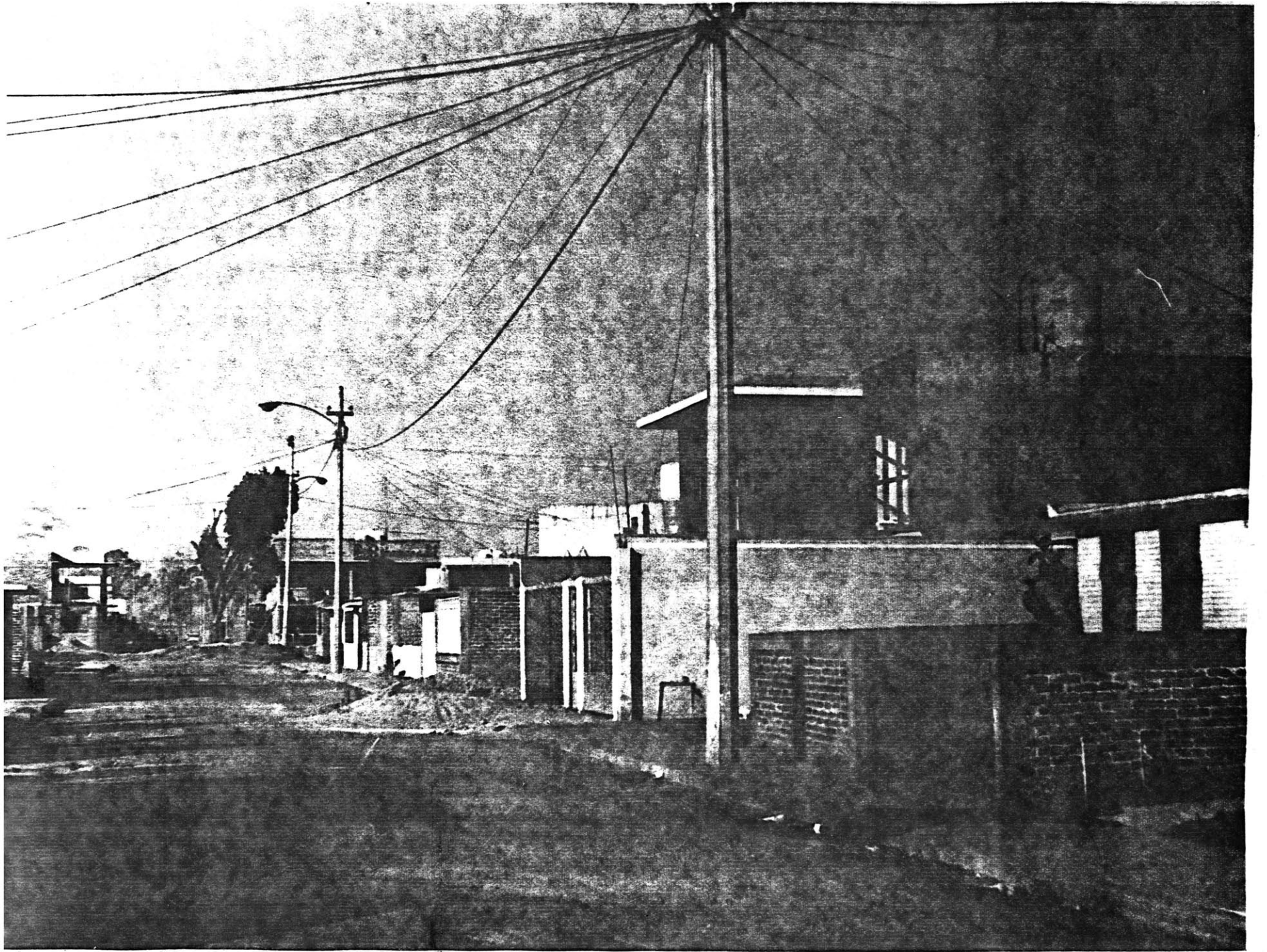
STREET IN THE SELF-HELP PART.



MANY PARTS OF THE SELF-HELP PROJECT ARE STILL BARE



THIS TYPE OF EMBELLISHMENT IS NOT RARE.



STREET IN THE SELF-HELP PROJECT - THIS PART IS COMPLETED



STORIES IN SELF-HELP PROJECT



WATER STILL HAS TO BE HAULED THIS WAY IN PARTS OF THE  
SELF-HELP PROJECT.