

HOME SITES FOR FAMILIES OF DIFFERENT INCOME
LEVELS IN PUERTO RICO

by

HERMAN VALENTIN-ESTEVEZ

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INTRODUCTION

Purpose

The purpose of the author in preparing this work was to present a comprehensive plan concerned not only with where people live, but also with how they live. The health and welfare of the people of Puerto Rico demand that all inhabitants have an opportunity for decent, safe, healthful and well landscaped housing facilities.

The rapid growth of the metropolitan area of San Juan and other large centers of population like Ponce, Mayaguez, and Arecibo has brought about a kind of urban development that is far from ideal. The speed with which cities have spread, far beyond their boundaries, without suitable zoning on the part of municipalities and a lack of civic pride on the part of the land developers, is bringing about a chaotic condition that will finally result in blighted districts and slums. This period of greater industrial development and higher income for labor should raise the standard of living if proper guidance is provided for urban development. Despite this significant advance in modern urban life in our society, our knowledge of the process of urbanization is unquestionably incomplete and below the level of other countries like the continental United States, Canada and countries in Europe. The forces behind the growth of urban areas, both, social and industrial, have brought about a flow of people to the cities that is difficult to direct or control.

Many land subdivisions have been built in the last 15 years but there are still not enough dwellings for our increasing and much better educated society, and specially for those families with low income. Much of the present housing is substandard, many dwellings are overcrowded, and many structures have been constructed in such a way that do not fit the needs of the present-day families.

Objective

The author's objective through this presentation is to make all the civic and government organizations, as well as the individual citizen, aware that,

...a home is not a detached unit but a part of a neighborhood, which in turn is part of a town; and that a good quality of the home usually depends at least as much on its surroundings as on its design and construction... (Adams 1934, p. 4)

Throughout this work special consideration was given to the planning of the blocks, selection of the site, planning of the home on site, and sizes of lots for high, medium, and low income families in Puerto Rico.

General Description of Puerto Rico

The island of Puerto Rico was discovered by Columbus on his second voyage to the New World in 1493. It is the smallest of the Greater Antilles--Cuba, Jamaica, Hispanola (Dominican Republic and Haiti), and Puerto Rico,--the biggest of the Smaller Antilles--a series of islands from Saint Thomas to Trinidad. It

lies between the north latitudes of $17^{\circ}55'$ and $18^{\circ}31'$ and west longitude of $65^{\circ}39'$ and $67^{\circ}15'$. (Roberts, 1942, p. 2). The north-central coast is 1,400 nautical miles southeast of New York City and about 996 miles from the eastern tip of Florida.

In shape the island of Puerto Rico is nearly rectangular. Its east to west dimension is 113 miles, and from north to south is 41 miles. Including all the small islands under its jurisdiction, Puerto Rico has an area of 3,435 square miles, which is about two-thirds of the size of Connecticut.

In 1950, the population of the Commonwealth of Puerto Rico was ^{about 2 1/2 million} 2,210,703 and has a density of 640.3 people per square miles as compared with 23.2 people per square mile in the state of Kansas and 50.7 people per square mile in the continental United States. (1950 U.S. Census)

Climate. Puerto Rico is located less than 20° off the equator bringing a tropical climate. The moist northeast wind, over the warm ocean, blows continuously during the day and strikes at right angles over the high mountains at the center of the island. The air is diverted upward and cooled below the dew point. Condensation takes place followed by rain, making the highest precipitation in the interior mountains. The average yearly rainfall is 71 inches, with a low of 21 inches in the southeast and 170 inches for the northeast. Occasionally almost 200 inches are reached in the highest mountains. (Otten 1951 p. 6). Even though there are no definite seasons, the island has a rainy period that extends from May 1 to November 1 inclusive, and a dry

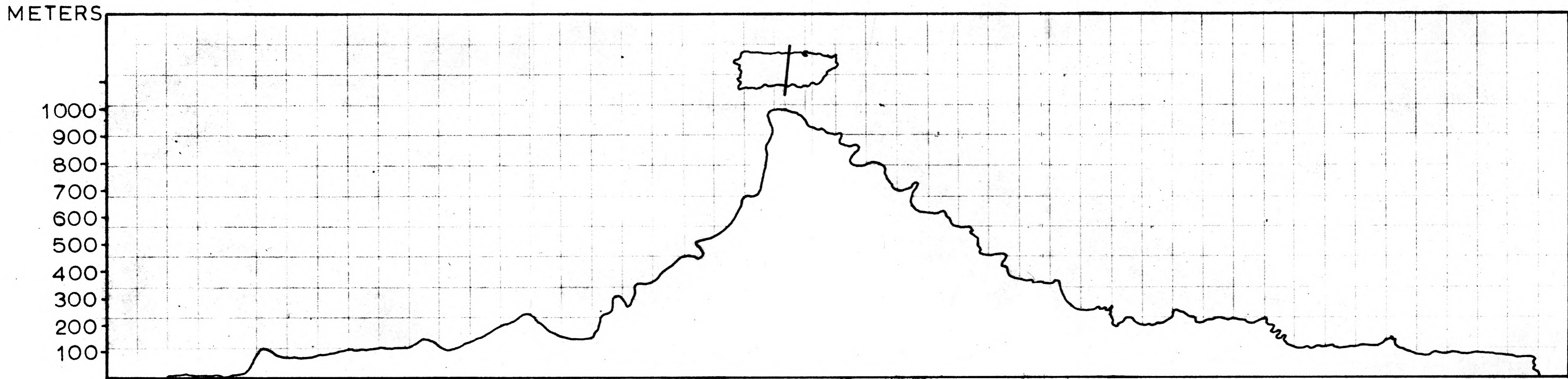
period the other six months. However, many showers occur but the heavy rains fall during the summer. (Roberts 1942, p. 47)

The island is frost free, with an average winter temperature of 75° and a summer temperature of 80° . During the day it is cooled by the moist-laden trade winds and at night by the breezes that blow from the cool mountains.

The relation between plant species and temperature is of minor importance because there is only about 10° or 15° difference (Roberts 1942, p. 54) for any length of time between the coolest and warmest part of the island. Some plants grow better in the cool mountains than in the warm coast but they are not restricted to the cool altitude. The amount of rainfall is directly responsible for the distribution of many plant species.

Topography. The island of Puerto Rico is divided into a northern and southern region by an east-west mountain range. Plate I (Roberts 1942, p. 430). The main mountain range runs in a northwesterly direction with a highest point of 3,000 feet above sea level. In the west this chain is known as Cordillera Central and as Sierra de Cayey in the east. The highest peak in Puerto Rico called Cerro de Punta has an elevation of 4,398 feet above sea level (Roberts 1942, p. 6) and is located south of Jayuya town. There are other less extensive chains of mountain ranges. One is Sierra de Luquillo which is a rocky, steep and forest-covered mountain of 2,500 to 3,500 feet high located in the eastern part of the island. Another chain is located in the northwestern part of Puerto Rico.

PLATE I



CROSS SECTION OF THE ISLAND OF PUERTO RICO

Soil. The total area of Puerto Rico is only 3,435 square miles, but there are a relatively large number of soil types. The reason for this variation in soils is their great differences in rainfall, relief, vegetation, and parent rock. Roberts (1942) reported in his Soil Survey of Puerto Rico, 358 soil types, phases and miscellaneous land types. They are divided into three orders known as Zonal, Intrazonal and Azonal. (See Appendix A for pH value of some of the more important soils in Puerto Rico).

PROCEDURE

Selection of the Site

In the selection of the site there are three factors which affect residential home development. They are the social, psychological and physical factors. The first two are beyond the scope of this work.

In presenting this problem the author developed one block each from three different land subdivisions, one each, for high, medium, and low income families in Puerto Rico, as well as the planning of the site, street design, street planting and other considerations important in the site selection.

In this work a master plan was used to select the area for the problem which represented a portion of land in the island of Puerto Rico. The following factors were considered in this study.

Physical Factors. The physical factors considered in this problem were: the topography, soil and subsoil, flood, smoke, dust and odors, access to facilities outside the neighborhood,

parks, playgrounds, transportation, existing vegetation and views.

Topography. All three blocks and the lots within them were planned to fit the topography. The area has good natural drainage which is desirable from the standpoint of low drainage cost. This area presents gentle sloping land for attractiveness without being unduly costly to develop. This topography is ideal for street layout because it lies between the minimum grade of 0.3 per cent to a maximum of 4.0 per cent.

Soil and Sub-soil. The soil and subsoil are ideal for easy excavations and site preparation. They show good texture for the installation of utility lines and for grading and planting. This area is free of ledges, hardpan, rocks and other obstructions that make excavations and planting difficult.

Flood. The area shows no indication of flooding in the last 25 years.

Smoke, Dust and Odors. An investigation through the master plan shows no sources of smoke from factories in the vicinity. Possible sources of dust and odors were not corroborated because information was not available.

Access to Facilities Outside the Neighborhood. Special consideration was given by the author to the facilities outside the site location. The distances were compared with Table 1 which is considered standard for community facilities outside the neighborhood.

This site is close to these standards shown on Table 1.

Table 1. Maximum distances from home to facilities outside the neighborhood.¹

Facilities	Distance from home		
	Walking distance	Transportation	Time in minutes
	in miles	In Miles	
Grade School	1	-	-
High School	-	2-1/2	-
Local Shopping Center	3/4	-	-
Church and Recreation	-	3-1/2	-
Major Shopping Center	-	4	-
Employment	-	-	40

¹ (Kostka 1954, p. 17)

Parks and Playgrounds. The areas dedicated to recreation are intended principally for youth past high school age and for adults of all ages who together make up approximately 65 per cent of the total population of the city. (Local Planning Administration 1948, p. 173). Of these approximately two-thirds represents youth who normally engage in recreation activities. Such play fields normally serve an area within a radius of from 1/2 mile to one mile.

Because of the limitation of land and the rapid increase in population there is an urgent need of well-planned playgrounds in Puerto Rico. These areas must be adequate in size but not larger than is necessary for efficient use. Table 2 shows what the

author considers should be included in these recreation areas and the space that each activity should have for good use.

Table 2. Suggested space divisions for playfields in the island of Puerto Rico.

Description of the area	:	Suggested space in cuerdas ¹
Areas for children playground		1 to 2
Areas for game courts		1 to 2
Field for men's sports		4
Field for women and girls		1 to 2
Areas for lawn games		1
Swimming pool area		1
Playfield building site		1/2
Landscape area		<u>2 or more</u>
		1 1/4 cuerdas or more

¹Cuerdas is the official measurement of land in Puerto Rico

A recent study (Valentin, 1959) showed that for every 100 low income families living in selected government housing projects in Puerto Rico, there were an average of 86 pre-school children. For this reason space should be available for approximately this number of pre-school children to play at one time. In page 19 and 20 the author discusses in detail the design of the block interior play areas for medium and low income families. (See Plates III and IV)

Transportation. The maximum amount of time that most people are willing to travel from home to work is about one hour. A

careful analysis of all kinds of transit facilities were made to determine their weak points and greatest usefulness, to develop a unified smoothly operating system. Consideration was given to the residential service streets, neighborhood feeder streets, minor traffic streets, and major traffic streets, as well as adequate public transportation to central business areas and schools with a maximum fare of 10-cents.

Existing Vegetation. The existing vegetation was considered in selecting the site because it creates a pleasant atmosphere, feeling of satisfaction and appearance of well-planned area. This is not only an esthetic consideration, but a basic psychological need.

Besides beautification other factors were considered such as noise, points of danger, objectionable structures, and night traffic.

Views. A pleasant view over the surrounding country and some growing plant life visible from all dwellings was considered as being desirable.

Planning of Home on Site

Orientation of House. The buildings on all three blocks were placed in such a way that each dwelling will have usable outdoor space for daily family needs and that the interior and exterior living space will have satisfactory light, air circulation and safety.

The rooms that perform any kind of service such as the kitchen,

utility room and pantry were grouped together for maximum use with easy access to the dining room and terrace. There is a close relation between the living room and terrace and garden. The children's play area is close and in direct view of the kitchen so that there is ease of supervision of children at play.

Garage and Carports. Separate garages from the houses were avoided to utilize the space into outdoor living area.

In the high and medium income level blocks the houses have only carports because the climatic conditions of Puerto Rico do not require a closed in storage space for automobiles.

Outdoor Living Space. The outdoor residential space was regarded as an extension of the individual dwelling. For the high income level families a sunny outdoor play space for babies and small children was provided. For medium income families play space is recommended but not necessarily developed. In low income families as well as in the medium income family block, play areas for pre-school children were provided within the blocks. The design was prepared in this way because recreation, gardening and enjoyment of the landscape are as important as adequate interior living space.

Privacy. Privacy was planned for the front and rear side of the houses in all three blocks. For large areas hedges and fences were combined. For small areas the hedges were avoided because they take too much space without giving complete protection.

Where fences were used in front of the house they were

attached to the building. The material was carefully chosen to blend and harmonize with the material of the house, as well as with the other houses of the neighborhood.

Prevailing Winds. The common direction of the winds in the island of Puerto Rico is from the northeast. Bearing this condition in mind all dwelling facilities and yard spaces were designed to have free circulation of air for comfort. Consideration was given to the effect of breezes on indoor thermal comfort, as well as the natural flow of air through all dwellings to assure effective through ventilation when the occupants desire their windows open.

Even though the year-around temperature in Puerto Rico is practically uniform, special consideration was given to summer temperature. By means of the orientation of the buildings and the placing of vegetation, temperatures of 72°F. to 75°F. are expected to prevail within the dwellings during the summer months.

Shade. In each of the designs of blocks the location of all shade and enframing trees were shown. (See Plates II, III and IV) The shade trees were planted to provide shade on the terrace as well as in the exposed side of the building during the hottest hour of the day. The location of such trees is on the southwest side of the terraces and buildings. (See Appendix for recommended shade trees)

Setting for the Houses. In the proposed setting of the houses shown in Plates II, III and IV the author has not prepared a "show place" but has developed a desirable setting for the houses. (This

topic is discussed in more detail in the setting for the individual houses for the three income level families shown on Plates VIII, IX, X and XI, XII, XIII.)

Design of Blocks

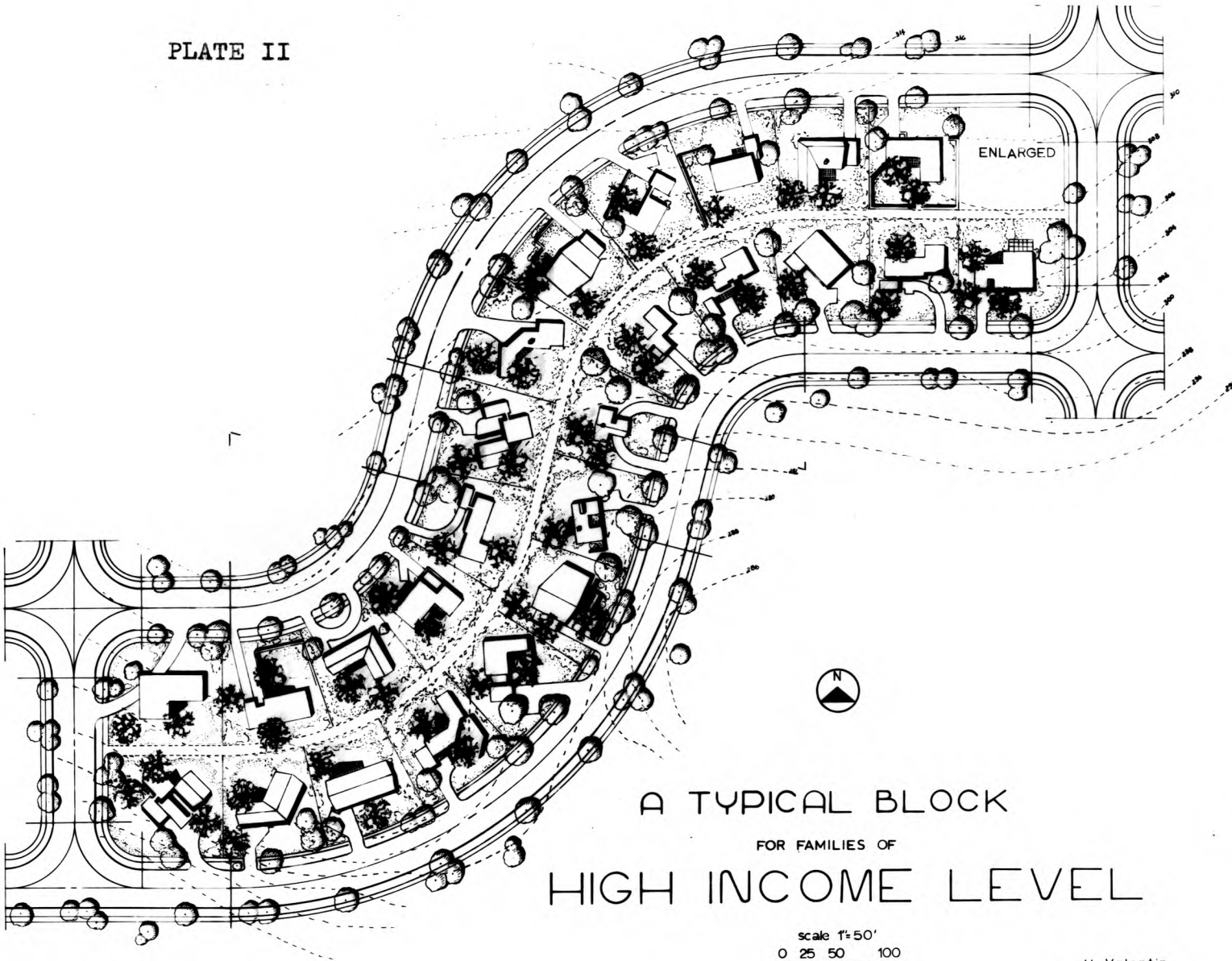
Block Design for Families of High Income Level. This block was designed on a topography with a gentle slope. It is intended to present an ideal block design for high income level families in Puerto Rico. Its S shape is not just for its interesting form but it was planned to fit the topography and character of the site. It is also designed to provide space for a house and gardens suitable for families of high income level. The shape was not determined by any geometrical pattern.

All streets are 60 feet wide from property line to property line, sidewalks four feet wide and seven feet were provided for planting strips. Sidewalks might not be necessary on both sides of the street in sections where high income families level blocks are designed. The width of streets, from curb to curb, is based on the amount of use to which it is put. The author has provided, in all the street layouts, a space of nine feet for a parked car and 10 feet for a moving car. It was assumed that these streets carried enough traffic to necessitate a provision for two parked cars and two moving cars. As a result all streets are 38 feet from curb to curb.

The total length of the block is 1,170 feet divided into 26 lots. Each lot has an average of 90 feet in the front and 95 feet

PLATE II

PLATE II



A TYPICAL BLOCK
FOR FAMILIES OF
HIGH INCOME LEVEL

scale 1"=50'
0 25 50 100

H. Valentin

long, except the four corner lots which have 90 feet by 100 feet.

An easement 10 feet wide runs from one end to another in the middle of the block. The use of this easement is for utility lines.

The houses were not placed in definite straight lines but they were given various set-backs to give variety and character to the general appearance of the street, even though the regulation set-back was 30 feet.

The street and lot trees were planted in such a way as to give the effect of houses standing in an open woodland. Closely knit tree groups were planted in the streets and lots to provide shade and to frame the houses as well as possible distant views. The street trees were selected to give a natural appearance by using trees of different species. The purpose for the plantings along the streets as well as in the yards has additional value in uniting the buildings and the land.

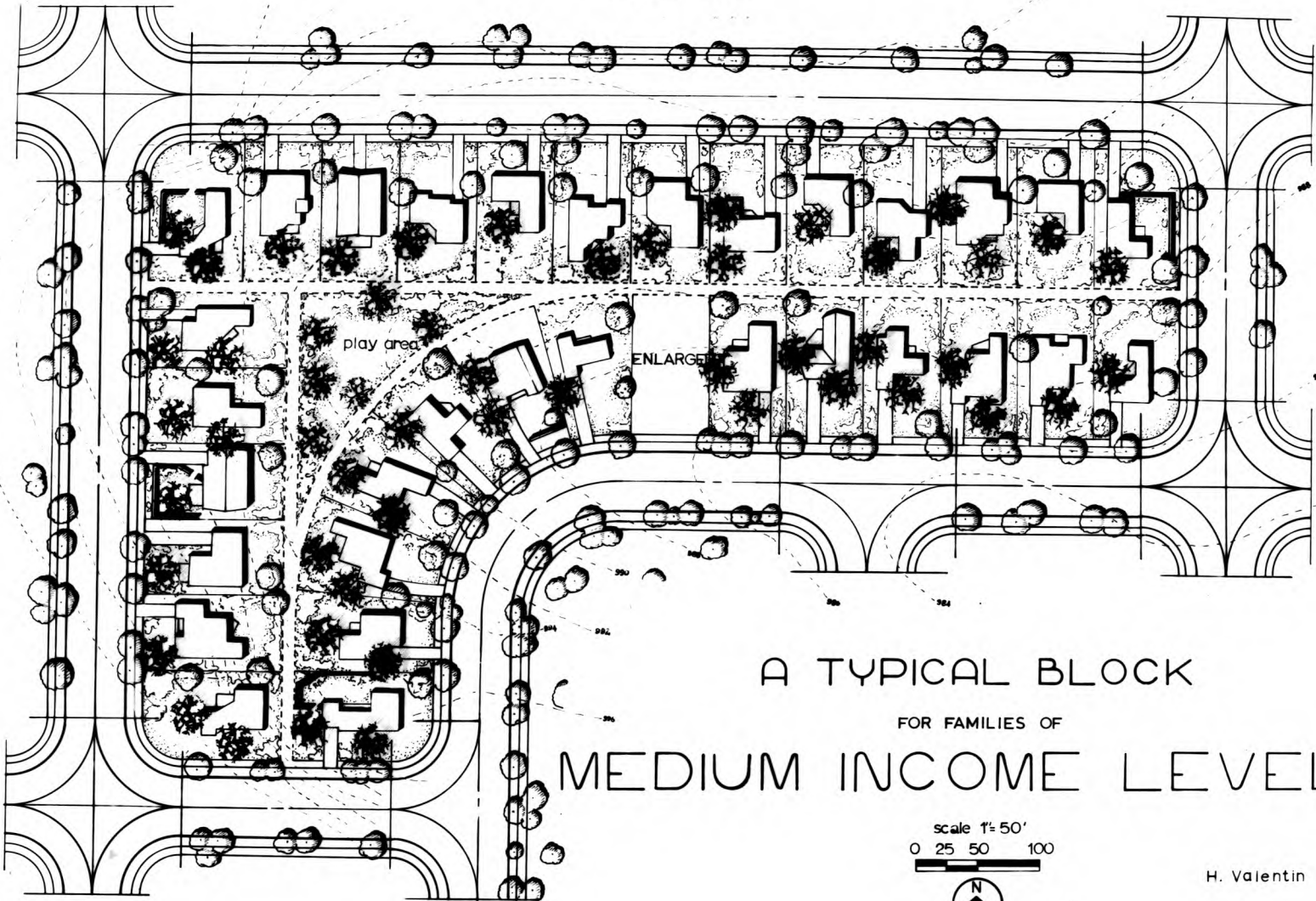
Irregular spacing was suggested because houses are set back at sufficient distance from the planting strip to ensure enough ground and moisture for normal growth. (See Plate II)

Block Design for Families of Medium Income Level. In the block for medium income families the design did not follow any geometrical pattern but it was planned to fit the topography. (See Plate III)

The streets are 60 feet wide from property line to property line. The paved area for automobiles two-way traffic is 38 feet side the same as in the block for high income level families.

PLATE III

PLATE III



A TYPICAL BLOCK
FOR FAMILIES OF
MEDIUM INCOME LEVEL

scale 1" = 50'
0 25 50 100



H. Valentin

Parking will be allowed on both sides of the street.

The dimensions of the block are 230 feet wide and 985 feet long.

There are 27 lots with a frontage of 55 feet to 60 feet, and an average width and length of 57 feet and 110 feet respectively.

There is a 10 foot easement running through the middle of the block and the play area.

The average set back of the houses is 25 feet.

The vegetation was planted in the same way as in the preceding block to give the houses a naturalistic setting.

The Play Area. The play area is located approximately in the center of the block. The area is to be used only by the pre-school children living in this block. The total area is 17,112 square feet. The purpose of establishing these interior play areas is to keep the children near home so it will not be necessary for them to cross a street to reach a playground. These areas will require less supervision of children by their mothers. Another consideration in designing this interior play area, was to acquaint the children with honest and decent ways of entertainment. This play area should also help to prevent juvenile delinquency in the future as well as to improve the relationship among the children, and to enable them to become better adjusted persons and better citizens when they reach adulthood.

Design of the Play Area. The proposed equipment for the play area is a sand box, wading pool, slides, swings, teeters and

benches. The space for each apparatus is $1\frac{1}{4}$ square feet for the sand box, 600 square feet for the wading pool, 160 square feet for the slides, $5\frac{1}{4}$ square feet for the swings, and 400 square feet for the teeters. This space will fulfill the need as to space for each child. (Ramsey and Slipper 1956) p. 622.

Maintenance of the Play Area. A voluntary leader selected from the neighbors of the block by a four-member board will receive a small payment for the supervision and care of the equipment bought by the families living in the block. The board will meet once a year to make plans and ask for assistance from non-profit civic organizations such as Service or Women Clubs or an educational agency such as the Extension Service. Each family will pay a small contribution for the replacement and care of the equipment as well as to pay the part time supervisor.

This area will not be under government supervision except for safety. The author's intention in proposing this plan is to take out of the minds of the citizens that they do not have to depend entirely on the government for the establishing and maintaining such areas.

Block Design for Families of Low Income Level. The rectangular design of this block, like the other blocks, was laid out to fit the topography. It is 990 feet long with $3\frac{1}{4}$ lots of 55 feet wide and 90 feet long except in the four corners and four lots in the middle. These four lots are 70 feet by 70 feet. The corner lots are 60 feet by 90 feet. (See Plate IV)

The design of the streets was the same as in preceding blocks.

Twenty-five feet set-back from the front property line was given for some houses and 35 feet for others in an irregular line to give a diverse variety and to relieve the monotony.

The planting arrangement for this block followed the same pattern of the other two blocks.

Interior Play Areas. There are two small play areas for pre-school children in the middle of the block. The total area of each one is 3,500 square feet. The equipment and space recommended for this play area is the same as the equipment for the medium income level families.

Maintenance of the Play Area. The overall plan is similar to that proposed in the preceding block except that the equipment will be supplied by the government as will the maintenance and supervision.

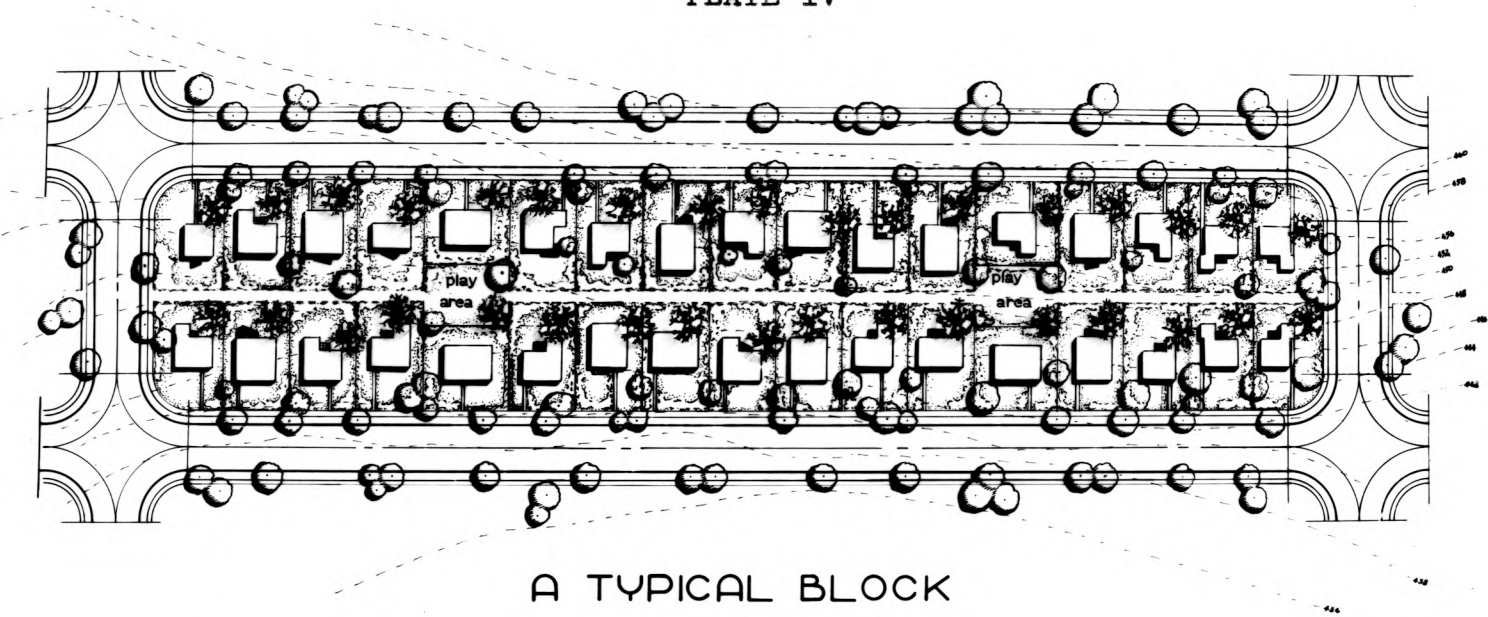
Design of the Home Grounds

For the High Income Family. The importance of a good landscape design is to provide utilitarian facilities, to increase outdoor living space, to give privacy and to create beauty as well as to increase the property value. (See Plates V, VI and VII) The factors considered in the landscaping of this house were: privacy, orientation of the rooms in relation to the lot, service, location of the play areas for children, terrace, the garden, and the setting of the house.

Privacy. To obtain the maximum privacy, the house was set back 30 feet from the side and front property lines. The triangular

PLATE IV

PLATE IV



A TYPICAL BLOCK
FOR FAMILIES OF
LOW INCOME LEVEL

scale 1" = 50'
0 25 50 100

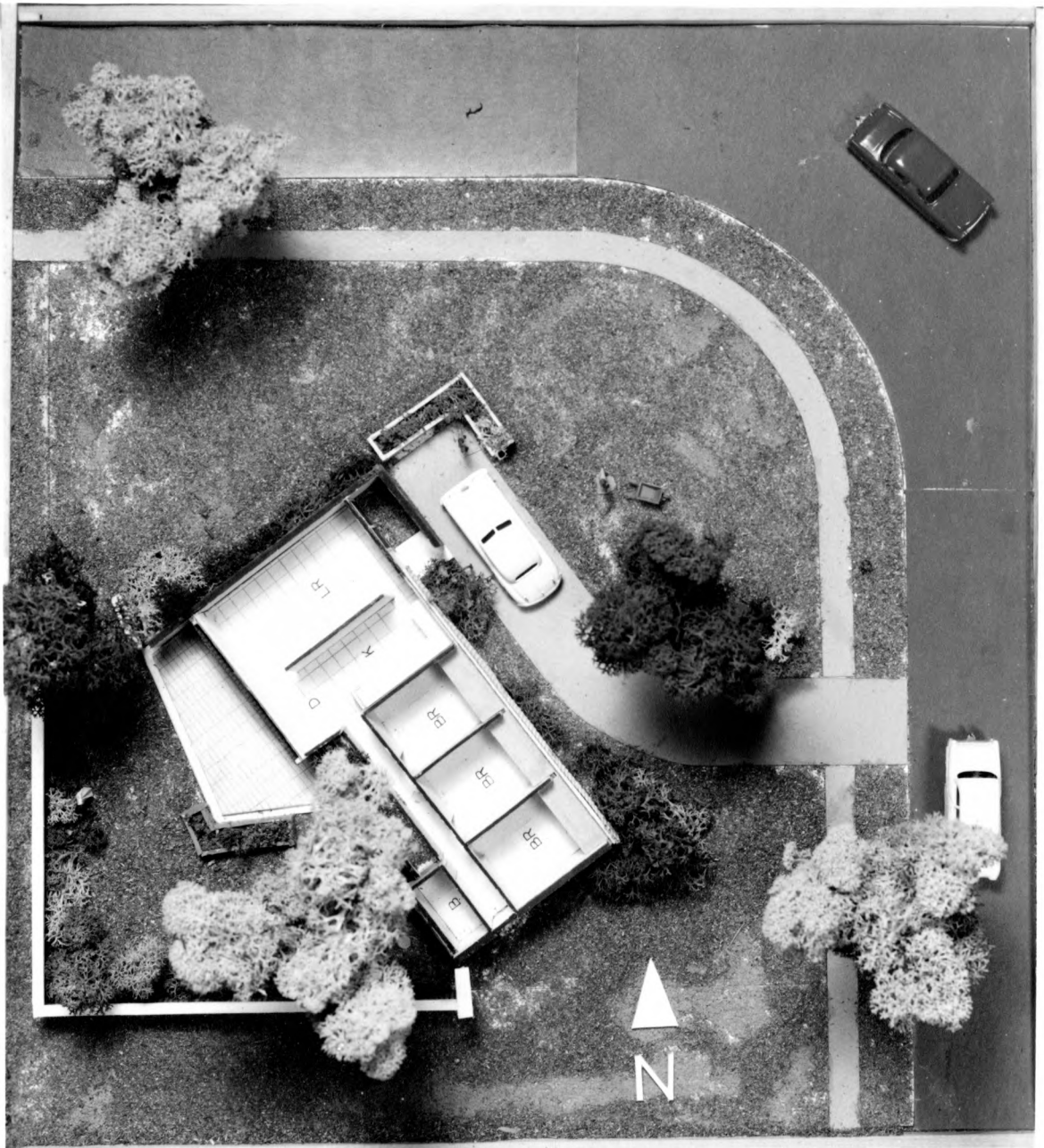


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PLATE V

Relation of the rooms to the ground

PLATE V



Scale 1/8" = 1'

PLATE VI

The relation of the terrace to the back yard

PLATE VI



PLATE VII

The setting of the house

PLATE VII



space on the back was enclosed with a six foot fence and shrubs. The purpose of this arrangement was to give a free and comfortable space for the occupants without being seen by the neighbors.

Orientation of the rooms. The bedrooms were placed to the northeast side of the lot. The reason for this orientation was because they were cooler in the afternoon and required less shading facilities. Another reason is to keep them away from the service area as well as from the living room activities.

The living room was placed on the southwest position to enlarge the living space. It is close to the kitchen and garage and directly related to the open space of the back yard. A sliding glass door will permit one to enjoy the garden from the inside. An architectural or sculptured feature was placed close to the fence to create a composition that could be enjoyed from the terrace and living room.

The carport was interrelated with the kitchen and the patio for easy access in case of rain or disagreeable weather. Planter boxes, three feet in height on two sides of the carport provides privacy from the street.

Terrace. The terrace which is sometimes called the main sitting area was built at nearly the same level as the living room floor. It is extended to be a prolongation of the inside living space and not a separated unit. It is framed with a flower bed at the northwest corner to give the observer a feeling of being in the garden. A gentle semi-circle of shrubs surrounds it to complete the enclosure.

Because the winds blow from the northeast, the terrace will have a good air circulation.

Setting of the House. It was the author's intention not to place the emphasis on plantings on the front but to make a balanced setting for the home.

Foundation plants were used around the walls of the building to connect the physical structure with the ground. The shape of the plants used were round and of natural colors avoiding attractiveness of individual plants that will draw attention away from the house. Because the building is 12 feet high, the size of the plants did not exceed six feet in height to keep them in scale and to harmonize with the overall composition. Large plants were avoided.

At the northeast corner of the house a compact knit of plants with three shrubs of medium height were used to increase the apparent width of the property. Specimen plants were avoided.

One framing tree was planted close to the 30 foot radius drive to shade it as well as to soften the roof line of the house. The street trees on the sides together with the shade trees on the back gave a balanced but a unsymmetrical setting.

Turf was used in all the open spaces to help moderate the temperatures and improve the appearance of the area.

In this problem the author emphasized the importance of avoiding crowding of plants and flowers. Emphasis was placed on the simplicity of plantings in order to reduce the cost of maintenance.

For the Medium Income Family. The same as in the high income

family house this development of house and grounds were designed with special emphasis on the utilitarian facilities, outdoor living space, for privacy and beauty. (See Plates VIII, IX, and X)

Privacy. For maximum privacy the house was set back 25 feet from the front property line. A six foot fence beginning close to the carport follows the property line entirely around the back yard. Shrubs planted close to the fence and at different elevations create an attractive enclosure for privacy.

Orientation of the Rooms. The bedrooms were placed to the front of the house. The reason for this arrangement is to separate the sleeping area from the more active areas such as the living room, the kitchen, and the dining room nearer the terrace and outdoor living space. There is an additional advantage in that the sleeping rooms get the full benefit of the prevailing winds during the warmest season.

The living room was placed at the back of the house so that the garden or private area could be enjoyed. It is inter-related with the kitchen and terrace for easy access in serving meals in the terrace. A feature was placed near the terrace to help create a pleasant composition that could also be seen from the living room.

The carport was placed at the right side of the house close to the main door and kitchen. It is surrounded by attractive low plants and hedge bringing the point of interest at the main door.

The Outdoor Living Area. This outdoor living area has been designed for privacy. It is screened from the utilitarian area by

a fence five feet in height and from the neighboring properties by a seven foot fence. The center of the area is an open lawn. All plantings of shrubs and flowers are kept in front of the enclosures to give a suitable background. This garden or outdoor room has a direct relation to the living room, kitchen, dining room and the terrace, and can be entered equally well from each of these areas.

The paved terrace is a prolongation of the living room floor. It is framed with a flower bed and is sheltered with the overhang. A low step unites the lawn with the terrace floor. A framing tree brings shade in the morning hours. During the afternoon it will be shaded by the house itself.

Utilitarian Area. This area is located close to the other service areas for easy access. Its purpose is to have a convenient place for clothes as well as for a vegetable and cut flower garden. A storage cabinet was designed in this area to keep all the tools used in the maintenance of the garden and the outside area.

Setting of the House. As stated in the description of the preceding house, the idea of a good setting is to create a composition in which the house dominates instead of just a pretty garden.

Foundation plants around the building unites it with the ground. The shapes of the plants are horizontal or in growth round and of natural color. The plants do not exceed six feet in height to keep them within scale and to harmonize with the composition.

PLATE VIII

The relation of the rooms to the ground

PLATE VIII

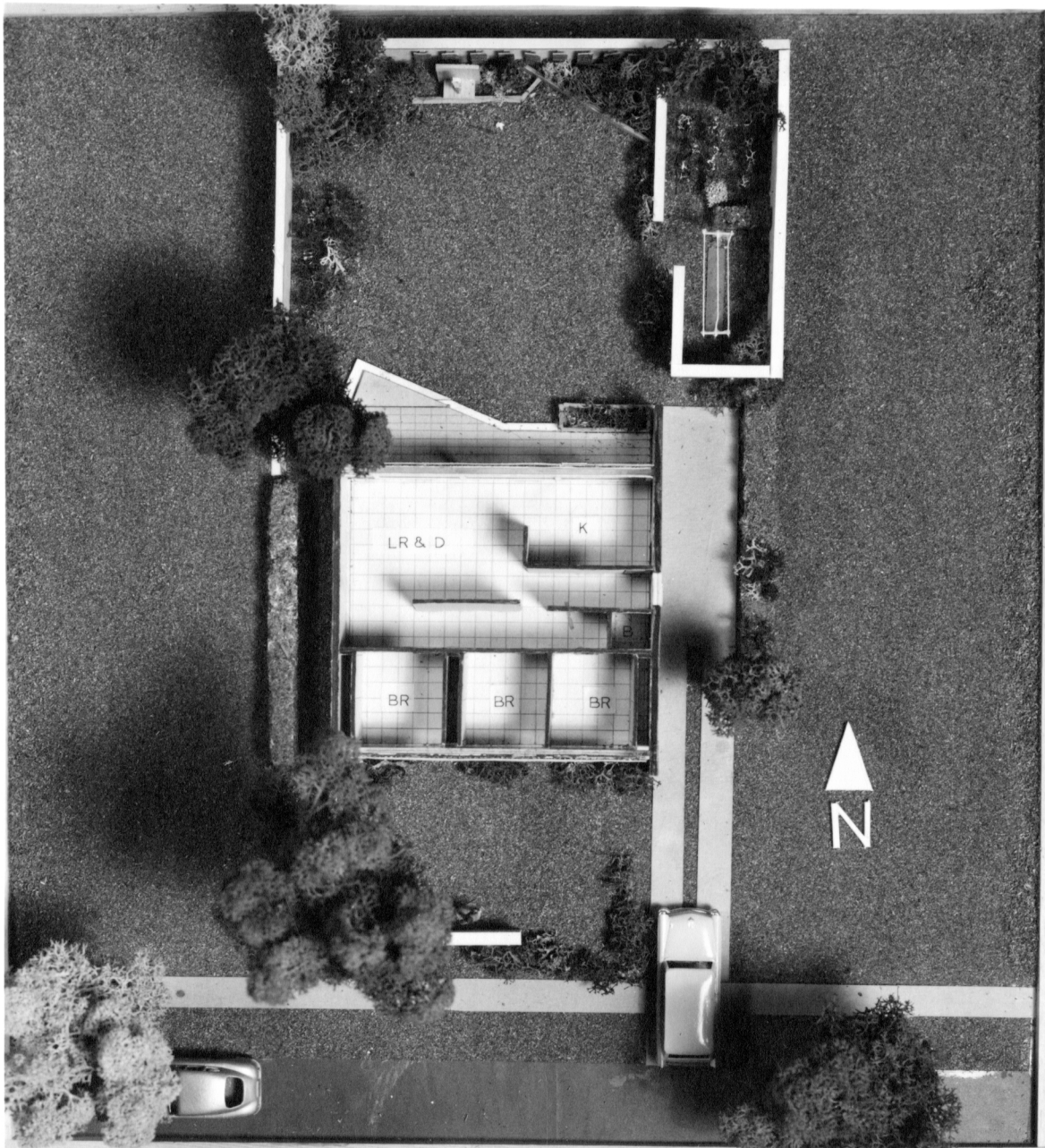


PLATE IX

The relation of the terrace to the back
yard

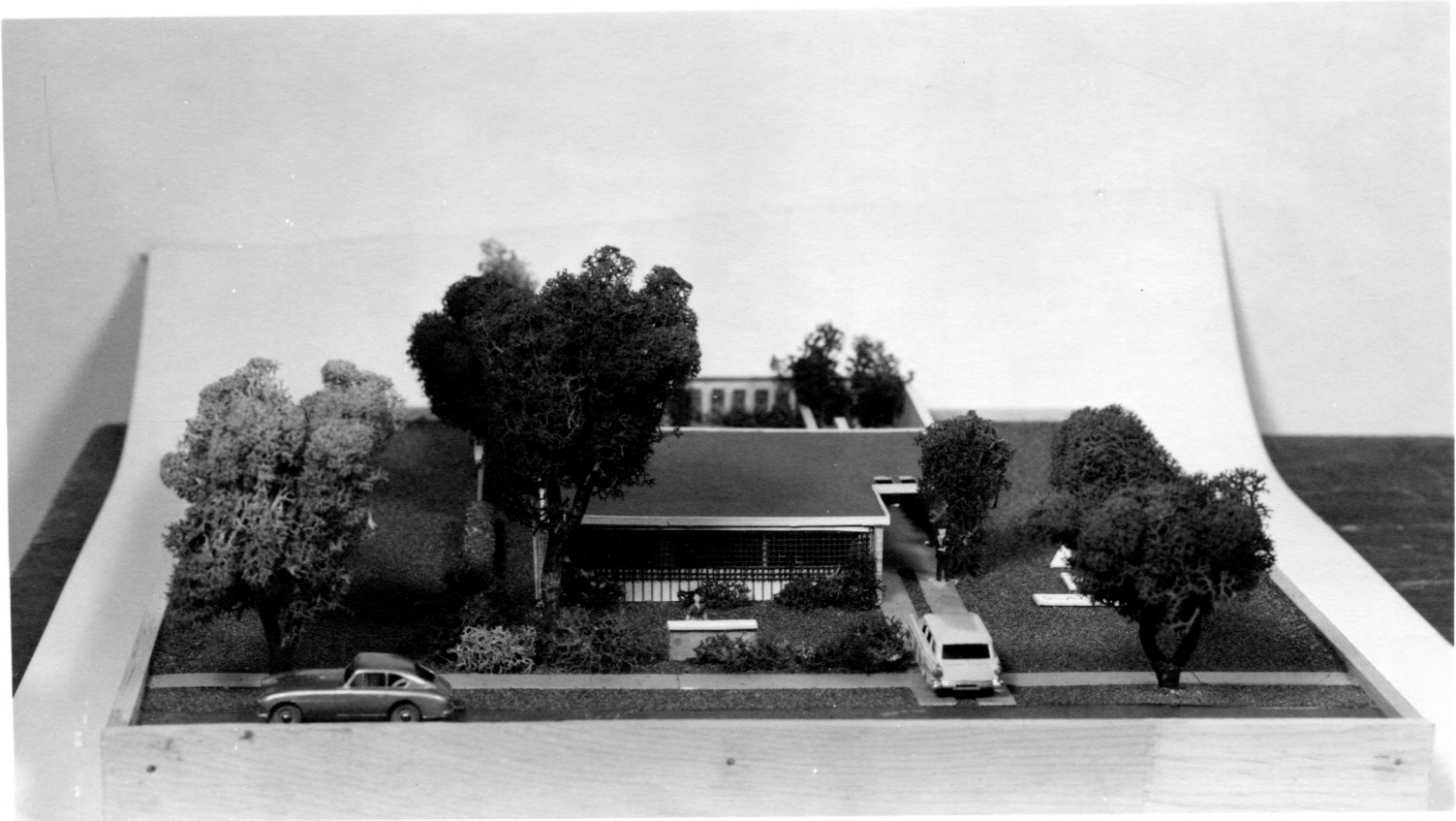
PLATE IX



PLATE X

The setting of the house

PLATE X



In the front corners of the lot a mass of shrubs extends along property lines ending at a small wood fence four feet high and six feet long. A shade tree emerges from the left shrub mass to shade the bedrooms, and to enframe the house.

The apparent width of the house is increased by a medium size shrub close to the carport, shrubs on the sides, and framing trees in the front.

In this setting, as well as in the others, specimen plants were avoided.

For the Low Income Family. The low income family house was designed to be economical in construction but efficient and convenient for spacious living. It was set back 25 feet from the front property line with no garage or carport provision. The grounds have been designed to provide privacy for the family with useful outdoor living space with maximum beauty.

Privacy. For privacy, small fences on the east and west sides of the house were designed to separate the front yard from the back yard. A border hedge five feet high encloses the back yard and separates the property from the neighbor's lots. Medium size shrubs create an attractive enclosure.

Orientation of the Rooms. The bedrooms were placed on the northeast side of the house to get full benefit of the prevailing winds during the summer which is the hottest season of the year in Puerto Rico. With this orientation the bedrooms are away from the hot sun in the afternoon which is the warmest period of the day.

The living room was placed at the rear side of the house for

privacy and enjoyment of the garden. It is well inter-related with the other divisions of the house.

The Outdoor Living Area. The outdoor living area is separated from the utilitarian area by a five foot hedge. It is surrounded by medium size shrubs and by fruit trees at the back for complete privacy. The center of the yard is an open lawn nearly on the same level as the small terrace. The design has been kept simple and the garden economical to maintain.

A small terrace paved with concrete is a continuation of the living room and only a few inches lower to prevent a driving rain from entering the room. A shade tree protects the terrace from the sun the hottest part of the day, and helps to enframe the house to complete a simple composition.

Utilitarian Area. The utilitarian area begins on the west side of the house and extends to the back property line. A vegetable garden and fruit trees planted in this area will help in the production of food for the family. It is inter-related with and convenient to the kitchen and utility room. The clothes lines are screened from view by a five-foot hedge. It is close to the kitchen where the laundry work will be done.

Setting of the House. The house has a 25 foot set-back with a small porch at the front door. A shade tree at the left corner of the lot will shade the bedroom, and at the same time it will help to enframe this side of the house.

Foundation plants of uniform size and form unite the house to the ground. Medium size shrubs close to the fence increase

PLATE XI

The relation of the rooms to the ground

PLATE XI

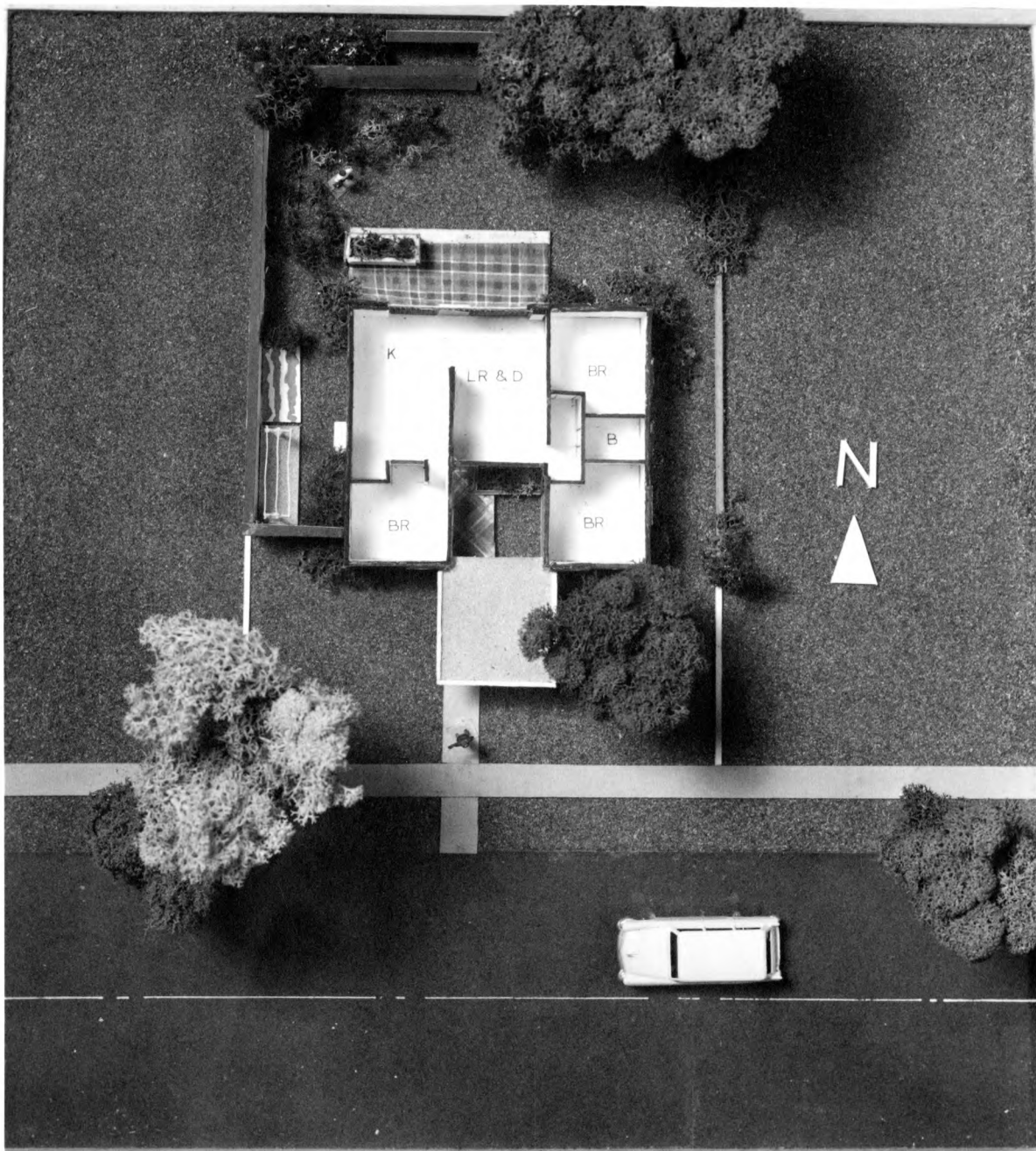


PLATE XII

The relation of the terrace to the back yard

PLATE XII



PLATE XIII

The setting of the house

PLATE XIII



the apparent width of the house, as well as improve the over-all composition. Conspicuous or gaudy plants that draw attention from the house were not used.

ACKNOWLEDGMENTS

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APPENDICES

Appendix A

Table 3. pH values of some of the more important soils in Puerto Rico.¹

Soil type	pH value	
	From	To
Aguadilla sandy loam	5.7	8.6
Aguirre clay	8.4	8.9
Alonso clay	4.9	5.9
Amelia clay	7.7	9.7
Bayamon fine sandy loam	4.7	5.4
Catalina clay	4.8	5.5
Catalina stony clay	4.4	4.8
Camaguey clay loam	6.3	8.5
Cialitos clay	4.7	5.3
Coloso clay	6.3	7.6
Martin Pena clay	4.2	4.8
Moca clay	5.4	6.6
Mucara silty clay loam	5.6	8.1
Paso Seco silty clay loam	6.6	8.0
Peat	4.4	5.2
Pinones clay	4.4	4.8
Sabana silty clay loam	5.3	5.8
Sabana Seca clay	4.4	4.6
San Anton loam	8.2	8.8
Santa Isabel clay	8.4	9.5
Serrano clay	8.4	9.3
Corcega sandy clay	7.7	8.6
Coto clay	5.1	6.5

Table 3. (concl.)

Soil type	pH value	
	From	To
Descalbrado silty clay	7.1	7.5
Fajardo clay	4.1	4.8
Guayama clay	6.6	7.1
Guaynabo fine sand	5.0	6.2
Mabi clay	6.5	6.9
Machete clay	7.1	7.4
Matanzas clay	5.0	5.4
Maleza loam sand	5.4	6.4
Santa Clara clay	7.6	8.4
Teresa clay	8.8	10.4
Toa silt loam	6.5	6.9
Torres clay	4.7	5.0
Vives clay loam	6.7	8.4
Yunes clay	3.9	4.6
Yunes silt loam	4.2	5.1

¹Roberts, 1942, p. 454-55.

Appendix B

Table 4. Large-leaved plants less than three feet high.*

Scientific name	Common name in Spanish
<i>Agave angustifolia</i> var. <i>marginata</i>	-
<i>Aglaonema commutatum</i>	-
<i>A. costatum</i>	-
<i>A. simplex</i>	-
<i>Anthurium acaule</i>	Rabo de Rata
<i>A. andraeanum</i>	Anthurium
<i>A. scandens</i>	Guinda
<i>Aspidistra lurida</i>	-
<i>Bromelia pinguin</i>	Maya
<i>Caladium bicolor</i>	Paleta de Pintor
<i>Calathea lietzei</i>	-
<i>C. ornata</i>	Zebrina
<i>C. vandenheckei</i>	-
<i>C. zebrina</i>	Zebra
<i>Canna</i> sp.	Cana
<i>Colocasia</i> sp.	-
<i>Costus malortieanus</i>	-
<i>Ctenanthe oppenheimiana</i>	-
<i>Dieffenbachia picta</i>	Rabano
<i>D. picta</i> var. <i>bausei</i>	Rabano
<i>D. picta</i> var. <i>Rudolph Roehrs</i>	Rabano
<i>Kaempferia rotunda</i>	Duende de Violeta
<i>Maranta arundinacea</i> var. <i>variegata</i>	Amaranta
<i>M. leuconeura</i> var. <i>kerchovenna</i>	-
<i>Peperomia obtusifolia</i>	-
<i>P. sandersii</i> var. <i>argyreia</i>	-
<i>Rhoeo discolor</i>	Sanguinaria
<i>Sansevieria cylindrica</i>	Sansiviera Redonda
<i>Sansevieria</i> sp.	-
<i>S. subspicata</i>	-
<i>S. thyrsoiflora</i>	Lengua de Vaca
<i>S. trifasciata</i> var. <i>laurentii</i>	Sansivera
<i>Strelitzia reginae</i>	-
<i>Tacca chantrieri</i>	-
<i>Zantedeschia aethiopica</i>	Lirio Cala

* U.S.D.A. Circular No. 35.

Table 5. Large-leaved plants three to six feet high.*

Scientific name	Common name in Spanish
<i>Agave americana</i>	Maguey
<i>A. sisalana</i>	Sisal
<i>Alocasia indica</i> var. <i>metallica</i>	Malanga Morada
<i>A. macrorhiza</i>	Panama
<i>A. macrorhiza</i> (variegated)	Panama
<i>Alpinia antillarum</i>	-
<i>A. sanderiae</i>	Jenjibre de Jardin
<i>Amomum</i> sp.	-
<i>Anthurium longilaminatum</i>	Lengua de Vaca
<i>A. magnificum</i>	-
<i>Canna coccinea</i>	Maraca
<i>Canna</i> sp.	Cana
<i>Colocasia esculentum</i>	Malanga
<i>Cyperus alternifolius</i>	Paraguaita
<i>Dieffenbachia seguine</i>	Rabano Simarron
<i>Dracaena sanderiana</i>	-
<i>Dracontium polyphyllum</i>	Guapa
<i>Furcraea selloa</i> var. <i>marginata</i>	-
<i>F. tuberosa</i>	Maguey Criollo
<i>Hedychium coronarium</i>	Jazmin del Rio
<i>Heliconia edwardus rex</i>	-
<i>Molineria hortensis</i>	-
<i>Musa</i> sp.	-
<i>Philodendron</i> sp.	-
<i>Xanthosoma caracu.</i>	Yautia Viequera

* U.S.D.A. Circular No. 35.

Table 6. Large-leaved plants six to twelve feet high.*

Scientific name	Common name in Spanish
<i>Alpinia purpurata</i>	Jenjibre Rojo
<i>A. speciosa</i>	Boca de Dragon
<i>Canna edulis</i>	Gruya
<i>Canna</i> spp.	Cana-Maraca
<i>Cordyline terminalis</i>	Bayoneta
<i>C. terminalis</i> var. <i>tricolor</i>	-
<i>Costus cylindricus</i>	Cana amarga
<i>C. speciosus</i>	-
<i>Hedychium</i> sp.	-
<i>Heliconia latispatha</i>	-
<i>Musa nana</i>	Guineo Enano
<i>M. sumatrana</i>	-
<i>Xanthosoma jacquinii</i>	Yautia de Palma
<i>Yucca aloifolia</i>	Bayoneta Espanola
<i>Y. gloriosa</i>	Bayoneta Espanola

* U.S.D.A. Circular No. 35.

Table 7. Large-leaved plants twelve feet or higher.*

Scientific name	Common name in Spanish
<i>Dracaena fragrans</i>	Dresina
<i>Heliconia bihai</i>	Botecitos
<i>Musa paradisiaca</i>	Guineo
<i>M. paradisiaca</i> ssp. <i>sapientum</i>	-
<i>Panadanus baptisti</i>	-
<i>P. pacificus</i>	-
<i>P. utilis</i>	Palma de Tirabuzon
<i>P. veitchii</i>	Pandano
<i>Phaeomera speciosa</i>	Flor de Cera
<i>Ravenala madagascariensis</i>	Palma de Viajero
<i>Strelitzia nicolai</i>	-
<i>Yucca elephantipes</i>	-

* U.S.D.A. Circular No. 35.

Appendix C

Table 8. Shrubs less than three feet high.*

Scientific name	Common name in Spanish
<i>Barleria cristata</i>	Enana
<i>Beloperone guttata</i>	-
<i>Breynia nivosa</i>	Nieve
<i>Euphorbia milii</i>	Corona de Espina
<i>Jatropha podagrica</i>	Tinaja
<i>Malpighia coccigera</i>	Azotacaballo
<i>Pedilanthus tithymaloides</i>	Ipecacuana
<i>Pentas lanceolata</i>	-
<i>Plumbago capensis</i>	Isabel Segunda
<i>Scutellaria ventenatii</i>	-
<i>Vinca rosea</i>	Playera

* U.S.D.A. Circular No. 34.

Table 9. Shrubs three to six feet high.*

Scientific name	Common name in Spanish
<i>Acalypha wilkesiana</i>	Acalifa
<i>Ardisia humilis</i>	-
<i>Bauhinia petiolata</i>	-
<i>Breynia nívosa</i>	Nieve
<i>Brunfelsia americana</i>	Tulipan Sencillo-Aguacero
<i>Calliandra</i> sp.	-
<i>Clerodendrum nutans</i>	-
<i>C. speciosissimum</i>	Coral
<i>Codiaeum variegatum</i>	Perigueto
<i>Euphorbia pulcherrima</i>	Flor de Poscua
<i>Gardenia jasminoides</i>	Jazmin-Tulipa
<i>G. posoqueroides</i>	-
<i>Grewia occidentalis</i>	-
<i>Hamelia erecta</i>	Belsamo
<i>Hibiscus rosa-sinensis</i>	Pabona
<i>Hydrangea macrophylla</i>	Hortensia
<i>Ixora chinensis</i>	-
<i>I. coccinea</i>	Cruz de Malta
<i>Jacobinia coccinea</i>	-
<i>Jatropha podagrica</i>	Tinaja
<i>Lawsonia inermis</i>	Reseda
<i>Muehlenbeckia platyclada</i>	Helacho chino
<i>Pedilanthus tithymaloides</i>	Ipecacuana
<i>Polyscias balfouriana</i>	-
<i>P. filicifolia</i>	Gallego
<i>Rosa</i>	Rosa
<i>Russelia equisetiformis</i>	Lluvia de Coral
<i>Serjania glabrata</i>	-
<i>Strobilanthes isophyllus</i>	-
<i>Synsepalum dulcificum</i>	-
<i>Tabernaemontana coronaria</i>	-
<i>Thunbergia erecta</i>	Viuda

* U.S.D.A. Circular No. 34.

Table 10. Shrubs six to twelve feet high.*

Scientific name	Common name in Spanish
<i>Acalypha hispida</i>	Rabo de Gato
<i>A. wilkesiana</i>	Capa de Obispo-Primavera
<i>Allamanda nerifolia</i>	Cautiva
<i>Ardisia polycephala</i>	-
<i>Artabotrys uncinatus</i>	Ilang-Ilang Trepador
<i>Bambusa multiples</i> var. Chinese Goddess	-
<i>Bauhina</i>	-
<i>Bougainvillea</i>	Trini and aria
<i>Brunfelsia hopeana</i>	-
<i>Buddleia asiatica</i>	-
<i>B. davidi</i>	-
<i>Byrosonima crassifolia</i>	Maricao Simarion
<i>Caesalpinia pulcherrima</i>	Clavellina
<i>Calliandra surinamensis</i>	-
<i>Calotropis procera</i>	Algodon de seda
<i>Carissa edulis</i>	-
<i>C. grandiflora</i>	-
<i>Cassia alata</i>	Tolantala
<i>Cestrum diurnum</i>	Dama de Dia
<i>C. nocturnum</i>	Dama de Noche
<i>Chysobalanus icaco</i>	Hicaco
<i>Cipadessa baccifera</i>	-
<i>Clerodendrum fragrans</i>	Flor de Muerto
<i>C. indicum</i>	-
<i>C. japonicum</i>	-
<i>Codiaeum variegatum</i>	Perigueto
<i>Coffea arabica</i>	Cafe
<i>Dombeya natalensis</i>	-
<i>Dracaena godseffiana</i>	-
<i>Erythrina crista-galli</i>	-
<i>Euphorbia pulcherrima</i>	Flor de Pascua
<i>Graptophyllum pictum</i>	Cafe con Leche
<i>Grewia asiatica</i>	-
<i>Hibiscus rosa-sinensis</i>	Pabona
<i>H. schizopetalus</i>	Zira
<i>H. syriacus</i>	-
<i>Ilex vomitoria</i>	-
<i>Ixora macrothyrsa</i>	-
<i>Lagerstroemia indica</i>	Astromelia
<i>Leea coccinea</i>	-
<i>Ligustrum indicum</i>	-
<i>L. ovalifolium</i>	-
<i>Malvaviscus grandiflorus</i>	Capucha da Manje
<i>Murraya exotica</i>	Mirto
<i>Mussaenda erythrophylla</i>	-
<i>Oncoba echinata</i>	-

Table 10. (concl.)

Scientific name	Common name in Spanish
<i>Petrea kohautiana</i>	-
<i>Polyathia suberosa</i>	-
<i>Polyscias filicifolia</i>	Gallego
<i>Psidium litterale</i>	-
<i>Punica granatum</i>	Granada
<i>Randia formosa</i>	Jazmin de Rosa
<i>Sambucus simpsonii</i>	Sauco
<i>Stenolobium stans</i>	Sauco Amarillo
<i>Tabernaemontana panducaqui</i>	-
<i>Thevetia ahoui</i>	-
<i>T. peruviana</i>	Cabalonga
<i>Thryallis glauca</i>	Lluvia de Oro
<i>Triphasia trifolia</i>	Chinita
<i>Vitex negundo</i>	Zouzgatillo

* U.S.D.A. Circular No. 34.

Table 11. Shrubs over twelve feet high.*

Scientific name	Common name in Spanish
<i>Acalypha hispida</i>	Pabo de Gato
<i>Bambusa multiplex</i>	-
<i>Banisteriopsis cornifolia</i>	-
<i>Bauhinia pauletia</i>	Arana Gato
<i>Bixa orellana</i>	Achiote
<i>Calliandra marginata</i>	-
<i>Carissa edulis</i>	-
<i>Cassia biflora</i>	-
<i>Cordia serrata</i>	Bombon Capitan
<i>Dovyalis caffra</i>	-
<i>D. hebecarpa</i>	-
<i>Duranta repens</i>	Lluvia
<i>Ehretia microphylla</i>	-
<i>Euphorbia cotinifolia</i>	Carroasco
<i>Flacourtia indica</i>	-
<i>Gardenia grandiflora</i>	-
<i>Gmelina elliptica</i>	-
<i>Hibiscus collinus</i>	-
<i>H. tricuspis</i>	-
<i>Holmskioldia sanguinea</i>	-
<i>Ixora acuminata</i>	Paraquita Chino
<i>Jatropha curcas</i>	Bola de Nieve
<i>J. multifida</i>	Tartago
<i>Kopsia fruiticosa</i>	-
<i>Lagerstroemia indica</i>	-
<i>Malpighia glabra</i>	-
<i>Mussaenda philippica</i>	Acerola
<i>Nerium oleander</i>	-
<i>Plumeria rubra</i>	Laurel Rosado
<i>Polyscias guilfoylei</i>	Alheli Rojo
<i>Pyracantha crenulata</i>	Gallego
<i>Stambucus simpsonii</i>	-
<i>Stenolobium stans</i>	Astromelia
<i>Theveta ahoui</i>	-
<i>Triphasia trifolia</i>	Chinita
<i>Vitex negundo</i>	Zauzgatillo

* U.S.D.A. Circular No. 34.

Table 12. Shrubs over 20 feet high.

Scientific name	: Common name : in Spanish	: Height : in feet
Bauhinia purpurea	Palo de Orquideas	40
Bixa orellana L.	Achiote	30
Callophyllum antillanum	Maria	
Cassia fistula	Cana Pistula	
Cassia javanica	Acacia Rosada	20
Cassia siamesa	Casia amarilla	25
Chrysophyllum	Caimito	50
Clusia rosea Jacq.	Cupey	60
Cochlospermum vitifolium	Rosa Imperial	20
Cordia borinquensis Urban	Muneco	45
Cordia sebestena	-	25
Cordia sulcata DC	Moral	60
Crescentia cujete	Higuera	20
Dillenia indica	Dilenia	35
Eugenia malaccensis	Manzana Malaya	50
Genipa americana	Jagua	60
Gliricidia secium	Madre de Cacao	25
Ixora ferrea	Palo De Hierro	30
Jacaranda acutifolia	-	50
Jambosa Jambos (L.)	Pomarrosa	30
Lagerstroemia speciosa	Reina de las flores	
Mammea americana	Mamey	30-60
Parmentiera cerifera	Palo de vela	30
Persea americana	Aguacate	50
Spathodea campanulata	Tulipan	
Tabebuia pallida	Roble	40
Terminalia catappa	Almendra	30
Vitex divaricata Sw	Higuerillo	60

HOME SITES FOR FAMILIES OF DIFFERENT INCOME
LEVELS IN PUERTO RICO

by

HERMAN VALENTIN-ESTEVEZ

B. S., Southwestern Louisiana Institute, 1953

AN ABSTRACT OF A THESIS

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The purpose of this thesis is to present a comprehensive plan concerning where and how people live. Many urban communities have been built in the past 15 years. The speed with which cities have enlarged, without suitable zoning on the part of the municipalities and a lack of civic pride on the part of the land developers, is bringing about a chaotic condition that will finally result in blighted districts and slums.

The specific objective of this presentation is to make the civic and government organizations, and the individual citizen, aware that each home is part of a neighborhood and the quality of a home depends as much on its surroundings as its design and construction.

The three important factors involved in the selection of the site for a neighborhood development are: sociological, psychological and physical. The greatest emphasis in this thesis was placed on the latter. The physical factors considered in this problem were: the topography, soil and subsoil, flood, smoke, dust and odors, access to facilities outside the neighborhood, parks, playgrounds, transportation, existing vegetation and views.

The development of three blocks, for three different income levels, was prepared in an area representing a portion of land in the island of Puerto Rico. All blocks have different shapes, not because definite geometrical patterns were used, but because they were designed to fit the topography. The area selected shows no indication of flooding, has suitable soil and subsoil and is free from dust, smoke, and odors. The location of the outside

facilities such as schools, shopping centers, churches and recreation areas and employment are within the standards recommended by the American Public Health Association.

Existing vegetation was considered because it beautifies the place and creates a pleasant atmosphere. A pleasant view over the surrounding country and some growing plants visible from all dwellings were considered for their aesthetic value as well as for their contribution to the psychological needs.

The buildings on all three blocks were placed in such a way that each dwelling will have usable outdoor space for daily family needs and the interior and exterior living space will have satisfactory light, air circulation and safety.

Service rooms such as the kitchen, utility room and pantry were grouped together for maximum use with easy access to the dining room and terrace. There is a close relation between the living room, terrace and garden. The children's play area is close and in direct view of the kitchen for ease in the supervision of children.

In the low and medium income level blocks the houses have carports because the mild climatic conditions of Puerto Rico do not require a closed-in storage space for automobiles. The outdoor residential space was regarded as an extension of the individual dwelling. It was designed in this way because recreation, gardening and enjoyment of the landscape are as important as adequate interior living space. In the high income level families, an outdoor play space for children was provided within each lot. In

the medium and low income families, the play area for pre-school children was provided within the blocks.

Fences and hedges were used to provide privacy to each dwelling. Fences in front of the house were attached to the building and made from a material that blended and harmonized with the material of the house.

All dwelling facilities and yard space were designed to have free circulation of air for comfort. By means of the orientation of the buildings and the placing of vegetation, temperatures of 72°F. to 75°F. are expected to prevail within the dwellings during the summer months.

All streets are 60 feet wide from property line to property line. They were designed for two-way traffic. A seven foot planting strip and four foot sidewalks were provided on each side of the street.

This has been a general description of the physical factors considered in the selection and development of the site. All the details of the landscape of the houses and the design of the blocks for the three different income levels is shown in models and plans respectively.