



A SUGAR CANE PLANTATION

IN

PONCE, PUERTO RICO

by

Pedro A. de Castro

Report on Thesis

Partial Fulfillment of the Requirements

for the

degree

Bachelor of Architecture

School of Architecture

Mass. Inst. of Technology

May 10, 1940

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278 Commonwealth Avenue

Boston, Massachusetts.

May 10, 1940

Dean W. R. MacCornack, Chairman

Thesis Committee

School of Architecture

Mass. Institute of Technology

Cambridge, Massachusetts.

Dear Sir:

As partial fulfillment of the requirements leading to the degree of Bachelor of Architecture, I hereby submit my thesis report entitled, "A Sugar Cane Plantation in Ponce, Puerto Rico.

Respectfully,



Pedro A. de Castro

Acknowledgements

I take this opportunity to thank the following for their kind assistance and encouragement during my years as a student in the School of Architecture.

Dean William Emerson

Dean W. R. MacCornack

For their generous assistance with the requirements of this program and for the data which they furnished me.

Sucesion Juan Serralles

Central Mercedita, Ponce, Puerto Rico

H. P. Conesa, Civil Engineer

Ponce, Puerto Rico

Jose M. del Valle, Treasurer

Central Constancia, Toa Baja, Puerto Rico

Ramiro Lazaro, Manager

National City Bank of N. Y., Ponce Branch, Puerto Rico

J. A. Dickey, Director

Association of Sugar Producers of Puerto Rico

Washington, D. C.

(copy)

C.

278 Commonwealth Avenue
Boston, Massachusetts.

May 1, 1940

Dean W. R. MacCornack, Chairman
Thesis Committee
School of Architecture
Mass. Institute of Technology
Cambridge, Massachusetts.

Dear Sir:

In partial fulfillment of the requirements leading to the degree of Bachelor of Architecture I hereby submit the title of my thesis, A SUGAR CANE PLANTATION IN PONCE, PUERTO RICO.

The problem consists in the replanning of the existing plantation "Central Mercedita" and the redesigning of several of its most important units.

Respectfully,

Pedro A. de Castro

(copy)

D.

March 13, 1940

Mr. Pedro A. de Castro
278 Commonwealth Avenue
Boston, Massachusetts

Dear de Castro:

I have your letter of March first submitting as the subject of your Thesis "A Sugar Cane Plantation in Ponce, Puerto Rico" which I am glad to approve herewith.

This seems to be a very practical problem for you to select and I assume that you have arranged to get all of the data necessary to make a rather complete study of the project, and I shall expect to have your program very shortly.

If there is anything the Department can do to help you, please be sure we shall be only too glad to do so.

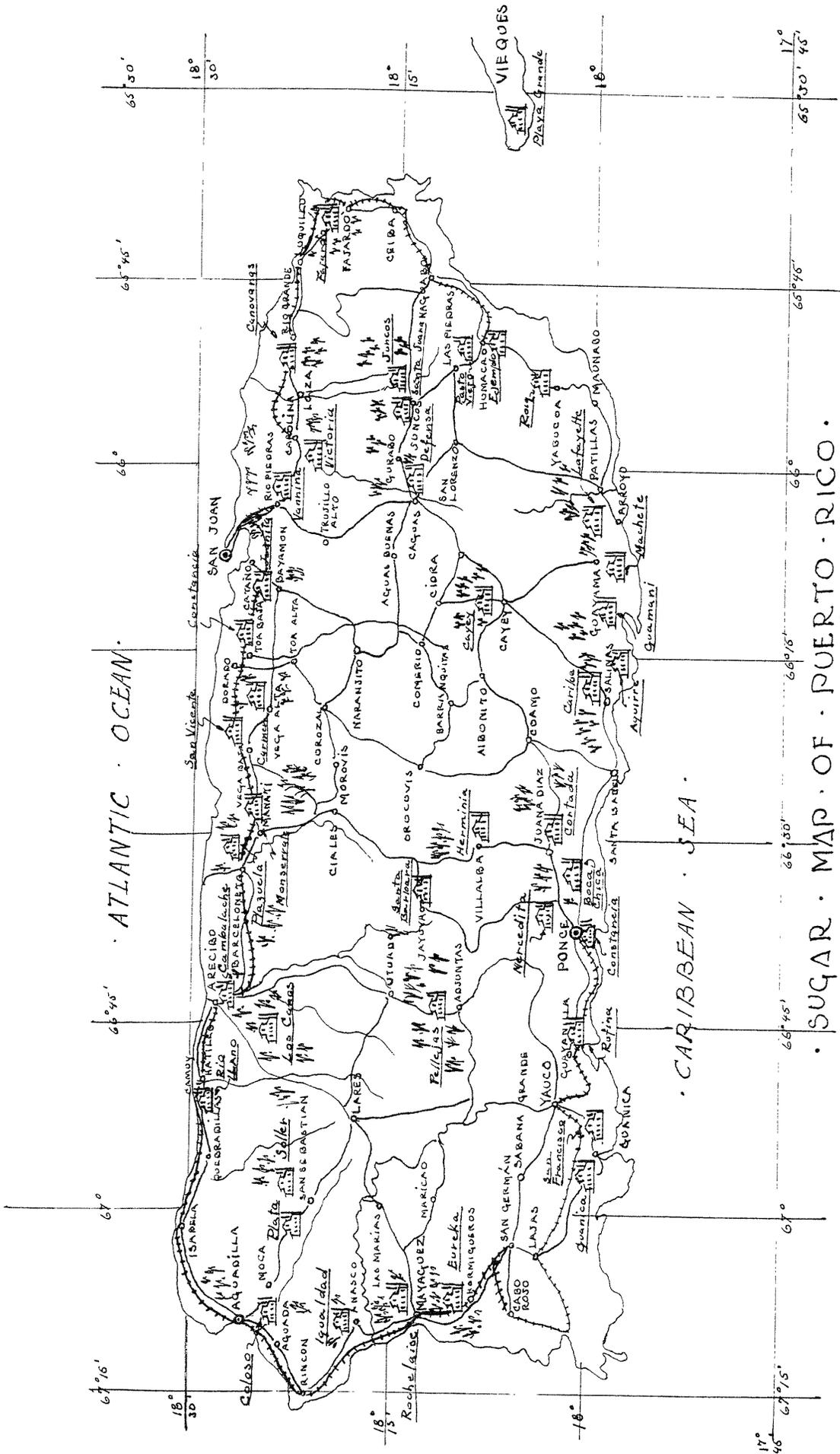
Sincerely yours,

Walter R. MacCornack, Dean
School of Architecture

WRM/h

Preface

In order that the nature of the problems confronted in the designing of a sugar plantation in Puerto Rico, might be better understood by the thesis committee, or those persons who might happen to read this report, I deemed it advisable to include in it^a general history of the sugar industry in Puerto Rico, along with the presentation of the particular problem covered by this thesis.



ATLANTIC OCEAN

CARIBBEAN SEA

SUGAR MAP OF PUERTO RICO

- Roads
- Railroads
- ☐ Sugar Centrals
- ☐ Sugar Plantations

SCALE OF MILES
0 5 10 15 20

General History of Present Sugar Industry

The sugar industry of Puerto Rico, like any industry in other areas, operates under a number of varying physical, social and economic factors which affect not only the organizational set-up which the industry must adopt, but also the results it is able to obtain. The obligations toward the various elements involved, such as consumers, labor, and the owners, are influenced widely by the physical, economic, and social conditions in the area where the industry operates. The industry has reached its present status by gradual development over a long period out of consideration for all the elements involved. Some discussion of this development is helpful in understanding the relationship of the industry to the various groups having claims upon it.

One of the greatest burdens under which the sugar industry of Puerto Rico operates is that of an excessively large population. The Island's resources are extremely limited. The population, on the other hand, is large, particularly in relation to the total area and crop land of the Island. These factors have resulted in complex social and economic problems, the greatest of which is the need for employment and income. Under such conditions, industries utilizing the agricultural resources are expected to make efficient use of them and, at the same time, conserve them for future generations. In addition, those industries must provide the maximum employment and income for the large number of people who must depend upon the resources for a living.

Puerto Rico has no mineral or forest reserves worthy of note. The principal use of the land is agriculture, with sugar cane as the principal crop. Though sugar cane occupies but little more than one third of the crop land, it is by far the largest industry of the Island, providing the basis for from two-thirds to three-fourths of the total income. In view of the densely populated conditions and the social and economic problems attendant thereto, much of the burden of local improvement falls upon the shoulders of the sugar industry. These conditions make the responsibilities of the sugar industry of Puerto Rico toward some of the groups depending upon it entirely different from those of the industries operating in other areas, and have had an important part in making the industry what it is today.

Industry the Result of Many Years Experience.

Many years of trial and error have proved that sugar production is best fitted to Puerto Rico's resources and market conditions. It makes the most efficient use of the agricultural land and is thus able to provide more employment and income in relation to area used than any other industry now pursued on a reasonably large scale. In sugar cane the Island has a substantial yield advantage over other areas.

The present organization of the industry also is the result of many years of experience in obtaining the greatest agriculture income from the land. Although developed independently of other areas with which it competes in producing and marketing sugar, the industry has advanced along approximately

the same lines.

Sugar production in Puerto Rico dates from almost the very beginning of the modern history of the Island. Sugar cane was introduced in 1515 from what is now the Dominican Republic. Sugar cane was first brought to the new world by Columbus in 1493, and its growth is the oldest industry carried on by the white man in the new world, exceeding even mining by several years.

Early Mills

Along with other areas, the industry has had to develop both equipment and process from the primitive methods of 1500. Until the latter part of the nineteenth century, the mills, for the most part, were comprised of crude arrangements, usually operated by ox-power, for pressing the juice from the cane, and open kettles in which the juice was boiled to concentrate it to the point at which sugar crystallized. In the first mills the juice was pressed from the cane by a crude mortar and pestle arrangement. This was later replaced by vertical wooden rolls through which the cane was passed. Both of these arrangements left a large percentage of the juice in the bagasse or residue. The juice was boiled in open kettles. The crystallized sugar, with a large amount of molasses adhering thereto, was placed in hogsheads, for the molasses to drain off. This process recovered only from 40 to 60 percent of the sugar in the cane.

Improvements were later made in the producing equipment. The wooden rolls were replaced by iron ones, which were located in a horizontal instead of a vertical position.

Steam was employed as power. Three rolls were later used instead of two, and still later additional sets of rolls were introduced in a tandem arrangement to extract the juices remaining in the residue from the first set of rolls. Evaporating equipment was improved also. In the place of the single iron kettle, four kettles of varying sizes were mounted over a furnace in order of size. In the process of evaporation the juice was introduced into the largest kettle, and, as it became concentrated, was moved progressively to the smaller vessels.

The capacity of early mills was limited. The transportation system consisted principally of ox-cart roads, and the amount of cane which such a mill could obtain was limited to that from the fields which were located within ox-cart distance. The output of the individual mills ranged from a few tons to around 1,000 tons annually. The product, known as muscovade sugar, was a low grade product as compared with present raw sugar testing 96 degrees or better.

Modern Mills

In 1901, Puerto Rico was included within the United States tariff structure. This made sugar production more advantageous than it had been previously, and less difficulty was experienced in getting outside investors to erect modern mills. In addition many local people borrowed capital from outside sources for this purpose, and in many cases two or more individuals consolidated their properties in order to provide the basis for obtaining the capital necessary for the needed improvements.

Modern mills require a supply of cane from a much larger area than the primitive mills, and this gave use to both productions and transportation problems. Consequently, along with modern mill equipment went the consolidation of the large coastal sugar estates. These properties, in order to provide an adequate supply of cane for the new mills, were built up not so much by the purchase of small farms as by the purchase of large estates held originally under Spanish Crown grants.

Large scale production required modern and efficient agricultural machinery, and the large area from which the mill hew cane required changes in the transportation system. Sugar cane railroads, therefore, were necessary to get the cane from the fields to the factory, the railroad along with the mill plantation and the mill itself comprising the modern and efficient sugar plant.

The modifications in the industry have changed neither the method nor principle of sugar production. The cane continues to be produced by both the mill owner and independent growers and to be processed together in the cane mill. The concentration of the sugar industry into larger, more efficient units was accompanied also by the extension of mill facilities to small growers who were previously unable to produce and market cane. The transportation system developed by the mill made this possible. Formerly only those within "ox-cart" distance were able to get their sugar cane processed. The modern mill extended a market for sugar cane to all those within hauling distance of the sugar railroad, and in later years with

improved roads and motor trucks, to practically every farm in the Island. In 1898, each mill in the Island ground the cane of an average of only seven producers; in 1939, each mill ground the cane of an average of 317 producers.

As the new modern mills came into operation, the owners of the small mills abandoned their processing plants and became independent growers, grinding their cane in the large units. Now the farmer who has only an acre delivers his cane to the railroad of the mill, and receives as his share of the sugar made from a ton of his cane a larger quantity than the total amount of sugar the earlier mills would have extracted. The small grower receives settlement for his cane on the same basis as the large producer.

Sugar Industry Basis for Other Important Enterprises

Sugar in raw form is not ready for consumption. The market procedure which has long been followed required that raw sugar be shipped to continental ports and refined there. More recently, however, this has been modified somewhat, so that some mills now refine sugar in connection with the production of raw sugar. Puerto Rico has several such refineries, which add to employment and income in the Island. The raw sugar industry, therefore, provides the basis for the refining industry.

Molasses, a by-product in producing raw sugar, provides the principal basis for the distilling industry. Rum and alcohol production increase the Island's income around \$4,000,000 annually and increase the opportunity for employment as well. Sugar, therefore, not only provides the principal source of employment and income, but the basis of the Island's second and third manufacturing industries also.

Existing Conditions

The Central Mercedita located at Ponce, Puerto Rico is one of the largest sugar mills in the Island. In connection with its raw sugar mill, is the Porto Rican American Refinery and the Serralles Distillery. The raw sugar mill was the first one to be constructed early in 1900 and as the industry expanded the refinery was added in 1925, until finally the distillery was built in 1937.

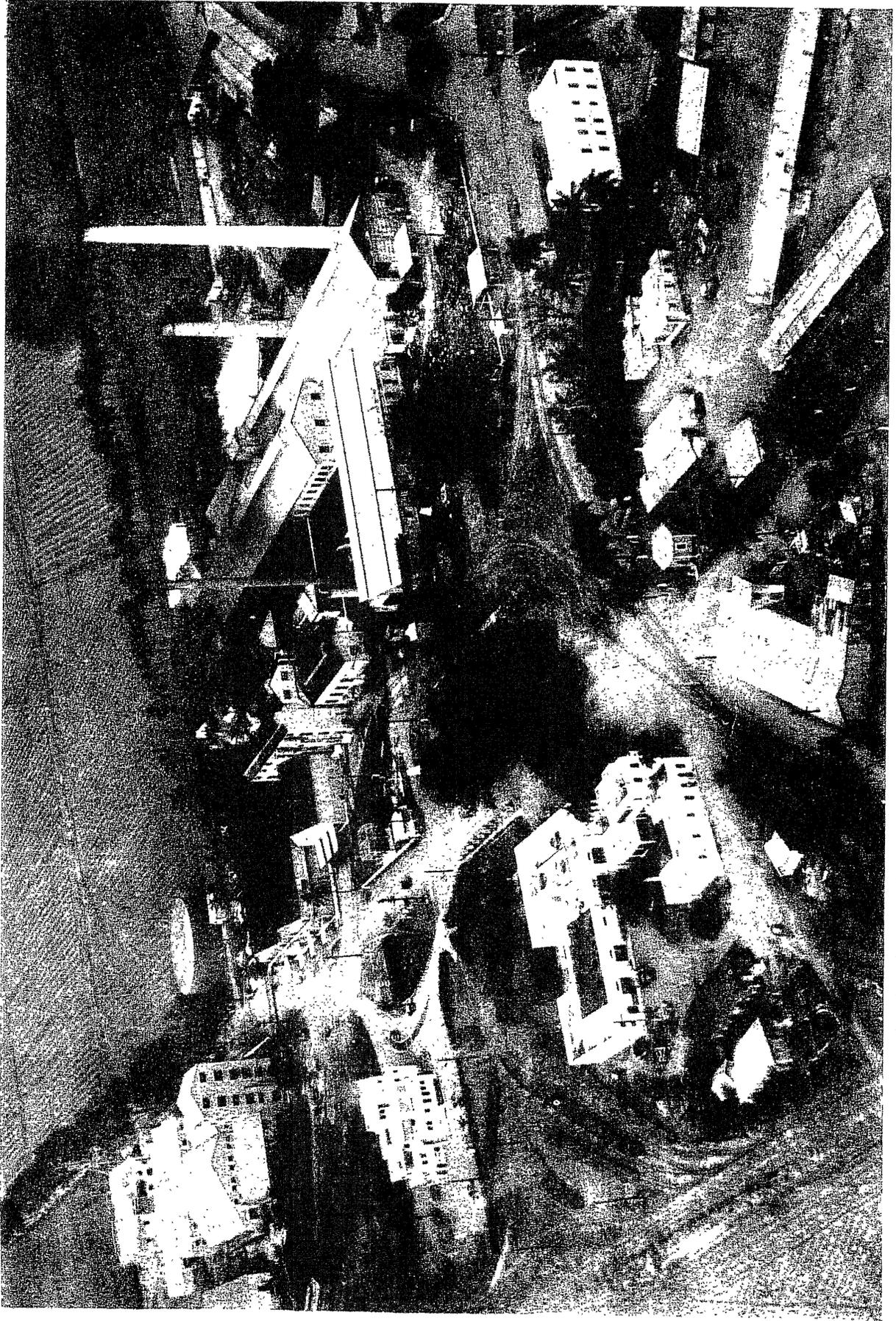
The sugar mill employs quite a few laborers and it provides houses for about 150 of these, that have to work directly in the mills. The workers that are laboring in the fields cutting cane.... etc.. are not permanent but part time workers, and they have houses elsewhere. Since the wages are low, the plantation also provides the workers with a small plot of land which they can cultivate and raise some of their foodstuffs.

There are also houses provided for the office workers and for the high officials and owners.

In view of the large number of people living around the mill, the central has really developed into a small community. It has its own store, which is run by the plantation and buys wholesale goods to sell to the laborers at cost, so as to save them the expense of middlemen, and further aid the laborer in saving some money. There is a hospital, restaurant, schools, fire-house, etc.....

However, the haphazard growth of the mill which was not originally planned in anyway whatsoever, has resulted in a terrible confusion of elements scattered all over the site and built where ever space was found, without regards of the relationship of one building to another. The main throughfare is

crisscrossed with railroad tracks and the whole plantation gives the impression of wild disorder, instead of the efficient smooth running effect, that a place like this should have.



An Aerial View of the Three Plants. The Porto Rican American Refinery and Central Mercedita Are at the Right, the Serralles Distillery in the Left Background

Purpose and General Requirements

In view of the present conditions of the Central Mercedita and the results of casual addition of buildings, it is obvious that a development plan was much needed. My first step was to study the relationship of the raw sugar mill to the surrounding farms and sugar cane lands, and I found that the present site was the most centrally located and the most accessible to all the growers that send cane to the mill for grinding. Having ascertained that the site was satisfactory for the development of the plot plan, the next problem was a problem of relating the buildings to one another in the most efficient way possible and also of separating the manufacturing units from the residential units and of providing a centralized administrative section.

After having completed the plot plan the buildings most needed for development were, the administration building, the requirements of which were set by the different types of clerical work carried on by the central and by the needs of the various officials offices.

The development of a loss cost housing unit is one of the most important features of the Central planning. The Central houses about 150 of its laborers free of rent, therefore they demand the lowest possible cost house. Since hurricanes are sometimes unwelcome visitors of the Island these small houses have to be built solidly, and hurricane proof.

Program

The need of a functional arrangement of the buildings of the Central, make a plot plan of the whole site imperative. It was assumed for the sake of the problem, that a complete relocation of buildings, would be possible if necessary, and that the present site would be used.

The problem is to plan the group arrangement and to design the administration building and a typical housing unit.

The Plot Plan will include:

- A. Raw Sugar Mill
- B. Sugar Refinery
- C. Distillery
 - 1. Storage for raw sugar and refined sugar
 - 2. Molasses tank
 - 3. Foundry and Mechanical Shop
 - 4. Locomotive House
 - 5. Lumber storage
- D. Administration Building
- E. Store
- F. Restaurant
- G. Hospital
 - 1. Nurses quarters
- H. School
- I. Church
- J. Bachelors quarters
- K. 150 laborers houses
- L. Fire House and Police
- M. 40 houses for white collar workers

N. 15 large houses for high officials and owners
There is also a small dairy to be located.

The Administration Building will include:

- A. Cashier Division
 - 1. Lobby
 - 2. Cashier's Office
 - a. Vault
 - 3. General Division
 - 4. Paymasters Office
 - a. Pay window to exterior of building
- B. Field Headquarters
 - 1. Civil Engineers Office
 - 2. Field General Office
 - 3. Field Superintendent
 - 4. Factory Superintendent
- C. Administration
 - 1. Waiting Room
 - 2. Stenographers room
 - 3. Auditors office
 - 4. File Room
 - 5. Directors Office
 - 6. Managers Office
 - 7. Managers Office
 - 8. Buyers Room
 - 9. Meeting Room
 - a. File rooms
 - 10. Guest Bar

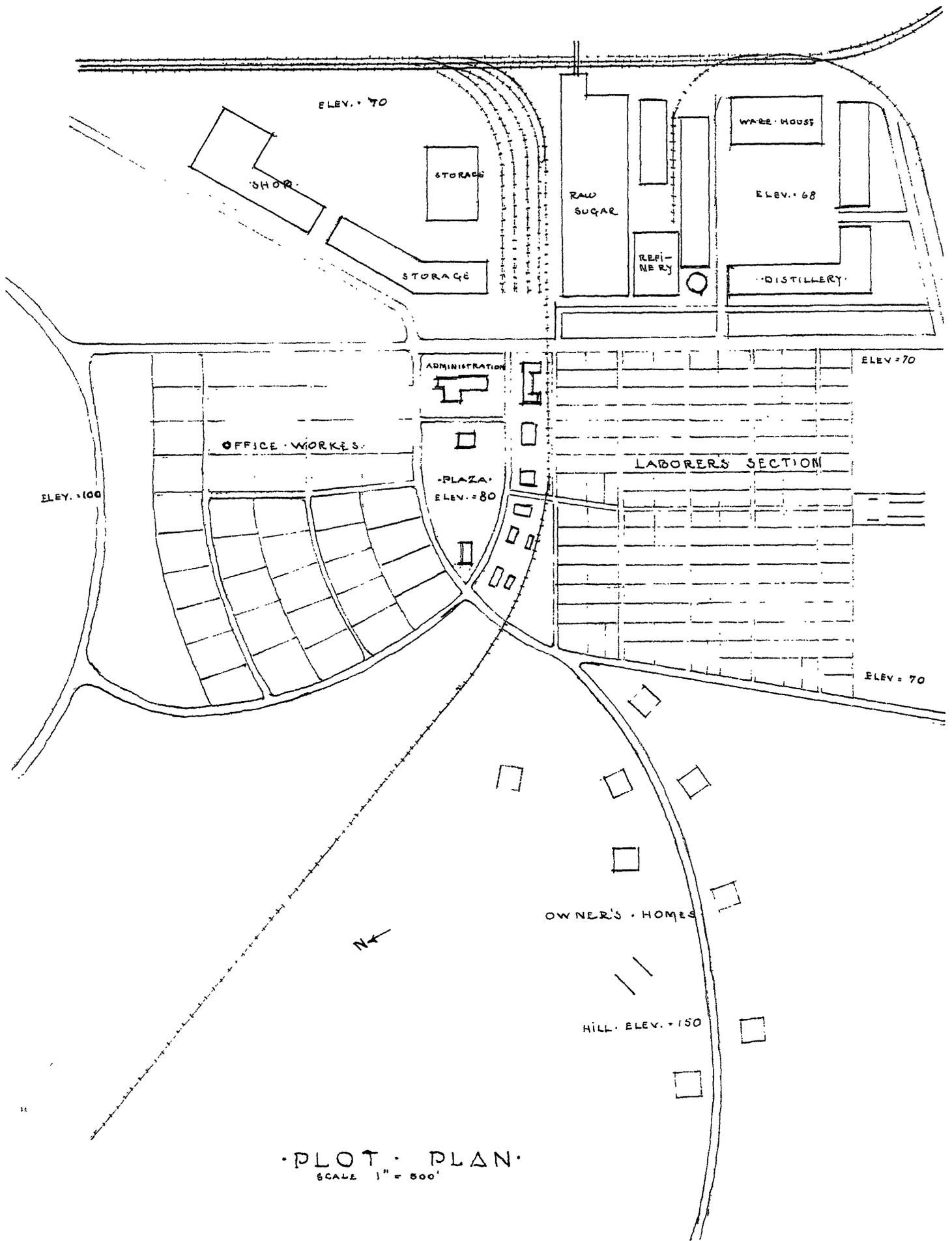
The housing unit will include:

1. 2 bedrooms and closets
2. Living - Dining Room
3. Kitchen
4. Sanitary accommodations
5. Porch

Site

The present site of the Central is a gently sloping tract of land with low hills on the north side and flat lands on all other sides. The main road to the city is towards the south, running east to west and the central has at present constructed a road branching from it and running north to the foot of the hills where this is in turn intersected by a road running north east around the hills towards another town.

The fields are all divided by roads that lead to the present site.



• PLOT PLAN •
SCALE 1" = 500'

Description of the Development of the Plant Plan

The location of the sugar mills and their composition was the determining factor to be considered. The raw sugar mills, the refinery and the distillery work more or less in conjunction. The refining uses steam power from the central and so does the distillery. Also the refinery and distilling depends upon the production of raw sugar and molasses for them to function.

The factories were located on the east side of the road leading to the Central, because there was the best possible location for the following reasons:

1. It was a fairly level tract of land and the buildings could be so arranged as to follow the contours in the most economical way possible.
2. The majority of the railroad lines come in to the factory from the east so that now the main road is as free as possible of railroad crossings.
3. A railroad yard can be developed to the north of the factory where all the tool shops and storage buildings are placed.
4. The prevailing wind coming in from the north-east blows fumes and smoke away from the other land more desirable for housing and administrative purpose.

As to the factory buildings themselves, they are so arranged as to provide a continuous process. The sugar cane comes into the east end of the raw sugar mill, goes through the manufacturing process and at the south west end the raw sugar can go into the refinery plant or be stored in the storage building adjoin-

ing the refinery. The refined sugar is also stored here and the railroad track comes right adjoint to the storage building so that the sugar can be sent direct to its destination. The sugar is mainly an export product and is shipped almost totally by train, about 7% goes for consumption in the Island and this is shipped by trucks who load from the other side of the storage building.

A molasses tank is placed the west end of the sugar storage building and south of the refinery. The molasses produced in the raw sugar mill and the refinery is pumped in here for storage and then goes into the distillery building which is L shaped, with the distilling end running parallel and adjacent to the road. The other end of the building is used as a rum storage ware horse, here the distilled rum is placed in oak kegs and stored for four years, at the end of which period it goes to the bottling plant and shipping building which is placed perpendicular to the ware house and closes the south east end of the inner court formed by the distillery group. Into this inside court drive the trucks for their loads of rum or refined sugar, for the sugar storage building faces the north end of this court and loads its sugar trucks from it. The distillery ships exclusively by truck, for its delivery has to be made to local agents around the Island who handle the export trade, so it is more economical to send the distilled goods by truck.

The main road leading to Ponce is intersected by the road coming from Juana Diaz at a point north of the manufacturing buildings and about 400 feet away. After careful consideration two other roads were brought in to meet at this point and a small traffic circle was placed to simplify traffic. One

of the two other roads runs west and the other one is the main road continued north.

The Administration building was placed on the south side of the west road and set well back from the main road which it faces. Secondary streets were placed to the side and back of the Administration building, the side street continuing on till it intersects the west road and forms an open space back of the Administration building. On the east end of this plaza was placed the small school building and facing the school on the opposite side of the plaza, a small chapel has been located.

Following the south side of the side street are placed the following buildings in order as to their nearness to the main road. Restaurant, store, fire house, small auditorium, also used as moving picture theater, bachelors quarters, nurses residences and the hospital.

All these buildings are used in general by all the residents of the Central, so that their placing around a central plaza gives them a proper setting and at the same time serves as a nucleus for the development of residential section.

The laborer's homes were placed to the rear, or south of the administrative section. The groups of houses were placed so that they all have plenty of light and air, and at the same time easy access to the factory and to the stores. The traffic of trucks and other vehicles that have to come to the factory can not use this section as a short cut. Since the laborers have no cars the only motor traffic in this section are clean up trucks and inspection cars.

West of the administrative center is a hill and here were located the houses for the high officials and owners.

Care was taken that all of these houses had plenty of land and located so as to give the best possible orientation and view. The residents of this section being on a different social class than the laborers and office workers prefer this isolation and since they own their houses or at least pay high rental for them, the houses can afford to be quite large and treated architecturally to satisfy each individual resident.

The office worker's living section was placed on the side of a hill to the north of the administrative section. Here also, care was taken that no traffic would go through the center of the residential area. These houses are more or less of the same type, but since the office workers pay rent they can afford to be some changes to break the monotony of the repetition of uniform houses. All these houses have garages and space for small gardens.

Conclusions:

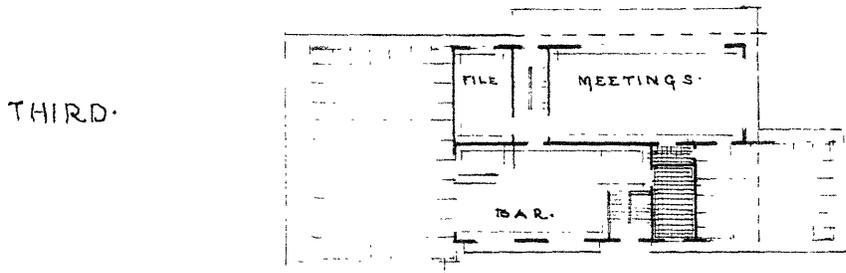
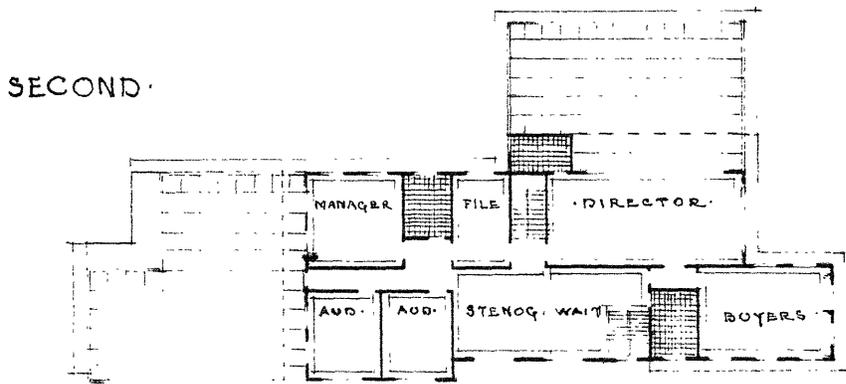
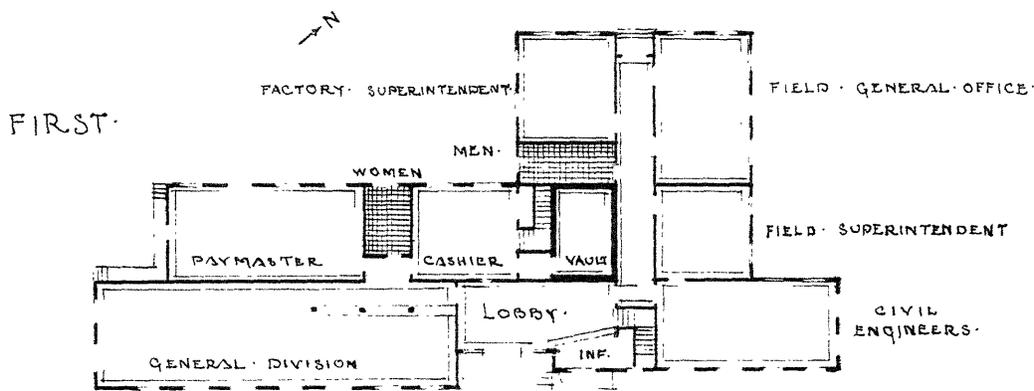
The placing of the buildings and the general planning of the Central was all done with a view of taking a conglomeration of buildings which are now, the result of periodic needs, without any regards to landscaping or architectural traits for the whole; and relocating them to give a definite center to the buildings and have the different sections of the Central placed in relation and harmony to each other and at the same time provide for the efficient working of the industry. By separating the manufacturing part of the small community, from the residential sections, the efficiency of the plant has not

been decreased, on the contrary now, due to its location, all units can work either in conjunction or independent of each other.

The residential sections have also gained a great deal, by eliminating through traffic, and arranging the lots neatly and by placing them conveniently near to the administrative center.



SOUTH EAST FAÇADE



THE ADMINISTRATION B'LD'G.

SCALE 1/32" = 1'-0"

The Administration Building

Description and Disposition of Elements.

Purpose:

The administration building is the headquarters of the high officers of the sugar plantation, all the administrative functions are done here as well as some others such as the engineering department where all technical changes and improvements are designed and the cashier section where the pay roll of the Central is handled.

Lobby:

The building is provided with a generous, well lighted lobby which leads to all the departments of the building. An information office is placed to the left of the entrance and controls the traffic of the lobby.

The Cashier Division:

The Cashier Division has three major sections to it:

1. The Cashiers Office
2. General Division
3. Paymaster's Office

This division was placed on the first floor so as to provide easy access to it, for those who merely come to it to get their pay checks.

The Cashiers Office:

This office was placed opposite the main entrance lobby and has a pay window opening on the lobby to pay the workers inside this building and to give receipts to buyers or sellers who have completed business transactions with the Central. The

Cashier has to have direct communication with the Directors Office, so a private stairway was placed connecting these two.

The Vault:

The vault is also part of the cashiers office and can only be entered through a small vestibule having double doors. The vault is placed at the center of the building and is large enough to meet all requirements.

The Paymasters Office:

The paymasters handle the payroll after the bulk sum has been turned over to him by the Cashier. Since the payments to the laborers are made in cash once a week, his main work is getting the right change into the pay envelopes. The laborers are paid direct from the paymasters office by means of a paying window at the end of the office, opening to the outside of the building. This eliminates the crowd of laborers from inside the building on pay day, the laborers have to form a single line to get their paychecks and they are forced to do this by the platform on the outside of the office.

The General Division:

In this section all the clerical work of both the cashier and the paymaster is done. It has easy access from both offices and is large enough to accommodate all the desks and file cabinets necessary.

Field Headquarters

The Field Headquarters are the section of the Administration building devoted to the factory design and field supervisor. It was located on the first floor to allow the engineers easy

access to the respective sections they are to inspect or supervise. The Field headquarters section is entered from the left side of the main lobby. The offices are placed on both sides of the corridor which also has an exit at the rear.

Civil Engineering Office:

In this office are located the drafting desks of engineers who are making contour maps and irrigation lay-outs of the cane fields. This office is mostly used for drafting and so plenty of light has been provided.

Field General Office

All reports from the Field Superintendent, Factory Superintendent, and Civil Engineers come to the Field General Office for approval and then they are taken to the Directors office. A large office was provided with room for two stenographers and a private office for the general supervisor.

Field Superintendent's Office

The office where the Field Superintendent gets his reports from the Civil Engineers and in turn prepares them for the Field General Office. This office is placed next to the Civil Engineers Office.

Factory Superintendent

All factory reports come to this office, where they are assembled and sent to the General Office. The office is not unlike the Field Superintendents and they both have plenty of light.

Second Floor

Administration:

The Administration unit was placed on the second floor to separate it from the Cashier and Field Headquarters and to remove the offices from the noise and traffic of the first floor.

Waiting Room

The Waiting Room is right next to the stairs and is separated by a counter from the stenographer's space.

Stenographer's Space

The Stenographers work in general for all officers on this floor and also attend the waiting room. They are located convenient to all the offices and have direct charge of the file room.

Buyer's Office

An office is provided for incoming buyers to hold conferences with the director. Visiting buyers are provided with desks in this office so that they may work away from their own offices.

Directors Office

The office of the Director is placed to the rear of the Waiting space and is entered by a vestibule that also has the stairs leading to the Cashiers office and to the Meeting Room. This office is quite large since the director has a great deal of books and he likes a spacious office. The office has its private toilet facilities and also opens into a large terrace.

Manager's Office

The Manager's Office is located to the right of the File Room and also opens into a large terrace. The manager can conveniently reach the Directors office, File Room, or any other office.

Auditors Offices

Two Auditors offices are provided each having ample room and plenty of light.

Third Floor

Meeting Room

The Meeting room was placed on the third floor directly above the Directors office because, there it is provided with the most privacy, quiet and light. The Director's private stairs lead to this room and it is also accessible by the main stairway.

File Rooms

Two file rooms were required and these have been placed so that they can be easily reached from the Meeting Room.

Guest Bar

A guest Bar has been provided over the waiting room, so that buyers and guests of the officers may be allowed to taste the product at the place of manufacture.

Corridors

All the corridors in the building are over minimum requirements and have plenty of natural daylight.

Stairways

The stairways are so located as to handle the up and down traffic as quickly and efficiently as possible. They are of ample width, comfortable rise, and are well lighted.....

Lavatories

The lavatories are distributed for the best possible conveniences. Private lavatories have been provided for officers where necessary and public ones are distributed at convenient places in the building.

Construction

The construction throughout the whole building is of reinforced concrete. This has been found to be the most practical construction material for the Puerto Rican climate due to its solidity and strength. Frequent hurricanes make this an important factor in the determination of structures. Also the natural destroying agents of a tropical country, such as, insects, humidity, etc.....have all been eliminated by the use of concrete.

The column spacing is a result of the convenient arrangement of rooms and economical modern structural considerations.

Elevations

The facades are all truthful, honest representations of the inside and of the material used in construction. The street facade is enhanced by the cantilevered canopy over the main entrance, which adds importance to the entrance and shelters the doorway. The cantilevered slabs over the windows are necessary to keep away the strong overhead sunlight of the mid-day sun. In general the facades are pleasing and express

the function of the building.

Conclusion

As a whole the plan holds together very well. The building shape fits the plot without sacrificing in anyway desirable, orientation, relationship and like. This building satisfies all the requirements of the Central.

Laborer's Housing Unit

Description and Disposition of Elements

Purpose:

The Central provides its laborers with small houses and tracts of land, free of rental. For this reason the houses have to be of minimum requirements and must satisfy the requirements of the average laborer's family. As a rule the laborer's employed by a Central have a wife, and one or two children. The houses which have been provided for laborer's up to now have been of varied types. Some have been of concrete others of wood, but in all cases, none of them has bothered much about trying to give the laborer as much comfort as possible. The aesthetic side of the cheap housing has been ignored by the Centrals and only the economic factors have been considered. It was my purpose to design a small, inexpensive, desirable house, and provide the laborer with as much comfort and beauty in his home as possible.

The Plan:

The plan consists of a small entrance porch, a living room dining room, two bedrooms, closets, lavatory and a small kitchen. There is a center wall which divides the plan in half and serves as center carrying wall. The Living Dining room has windows on two sides giving generous light and ventilation, while the two bedrooms are placed on one of the long sides of the living room. The kitchen and lavatory are placed adjacent to each other to save on plumbing costs and the lavatory is placed next to the bedrooms. A money saving feature of the kitchen is its built in sink and charcoal grille which is the

cooking method employed by laborers who can't afford gas or electricity for cooking. The bedrooms have cross ventilation and can each accomodate two persons.

Construction:

The house is so planned as to be able to be constructed of either wood or reinforced concrete at the minimum costs of each material. My recomendation however is for the concrete house for several reasons. First, the house is stronger, more durable and more sanitary than the wooden house. The wooden house has to be constructed on concrete pillars raising it from the ground to keep the floor dry, while the concrete house floor can be built right on thr ground and keep out moisture in addition to vermin. Second, the actual cost of the construction of the concrete houses is not very much over that of the wooden houses, and the permanence of the concrete house offsets this slightly higher imitial costs. Third, The concrete house is cooler than the wooden house, roofed with corrugated iron, and fourth but not least the concrete house makes a more attractive, livable, small home.

Elevations:

The facades are a simple direct expression fo the plan and material and are quite attractive. No attempt at superfluous embellishments have been made and this in itself makes the houses more attractive.

Conclusion:

The plan as a whole works a great deal more satisfactorily than the old plan of the laborers homes and is quite a bit more economic. Waste areas have been eliminated completely and everything in the home has its function. The house satisfies all the requirements of the Central, and adds to them the closet space provided in the bedrooms. In spite of this, the house can be constructed for the same amount, and perhaps less than what was spent on the existing houses.

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