

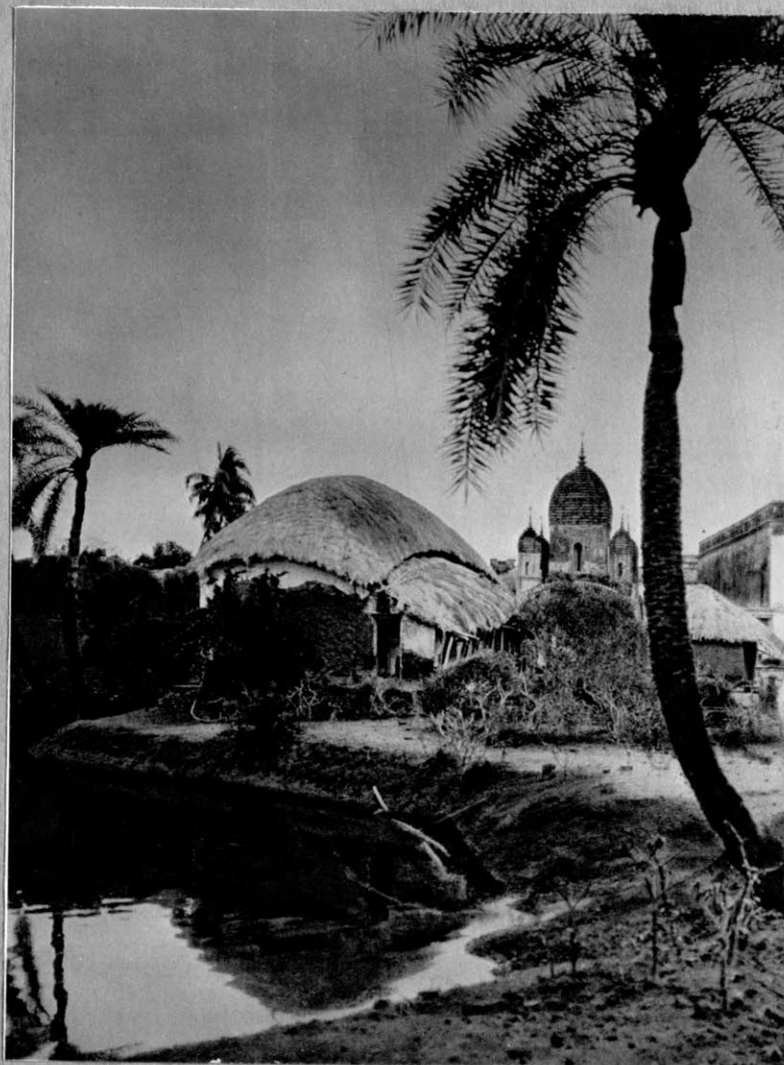
A HOUSING PATTERN FOR PRESENT DAY RURAL WEST BENGAL,
INDIA

SUBMITTED IN PARTIAL
FULFILLMENT OF THE
REQUIREMENTS FOR THE
DEGREE OF MASTER OF
ARCHITECTURE
ON SEPTEMBER 1, 1955

✓

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✓



A WEST BENGAL VILLAGE
Photograph by Martin Hurlimann

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A Housing Pattern for Present-Day Rural
West Bengal

V. Sundareswaran

Submitted for the degree of Master of Architecture in the Department of Architecture on September 1, 1955.

The concept of an organized living is not new within the Indian communities and it has been recognized ever since the days of Mohenjo-Daro wherein the remains of an ancient civilization indicate the existence of a highly developed and established system of planning technique as far back as 5000 years ago. It is only recently that certain political and economic changes have completely shaken the fabric of the whole Indian society and planning is today regarded as a luxury or superficial activity and is reserved for situations of noble importance instead of as a tool for organized living in villages and cities. However, with the dawn of freedom, the importance of planning has been more realized and the current development programs attempt to revive India's past glory through building up her vast resources of nature, labor, and culture.

The following study, being made at a time when India is preparing for the huge rural development program conceived as part of her Second Five Year Plan, is most timely. The author, in the following pages, attempts to make a study of the possibilities of good housing inherent in the traditional techniques and local materials of West Bengal and develop a pattern of housing for the groups of people living in the warm and humid regions of West Bengal.

Housing in Bengal, as in other parts of the country, has been in the past the monopoly of a fortunate few and the majority of human beings have been living in conditions and surroundings that can only be called inhuman. In approaching this problem, the author's goal is to provide minimum but decent and healthy living conditions for all types of people irrespective of family status and income.

Cambridge, Massachusetts
September 2, 1955

Pietro Belluschi, Dean
School of Architecture and City Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Sir:

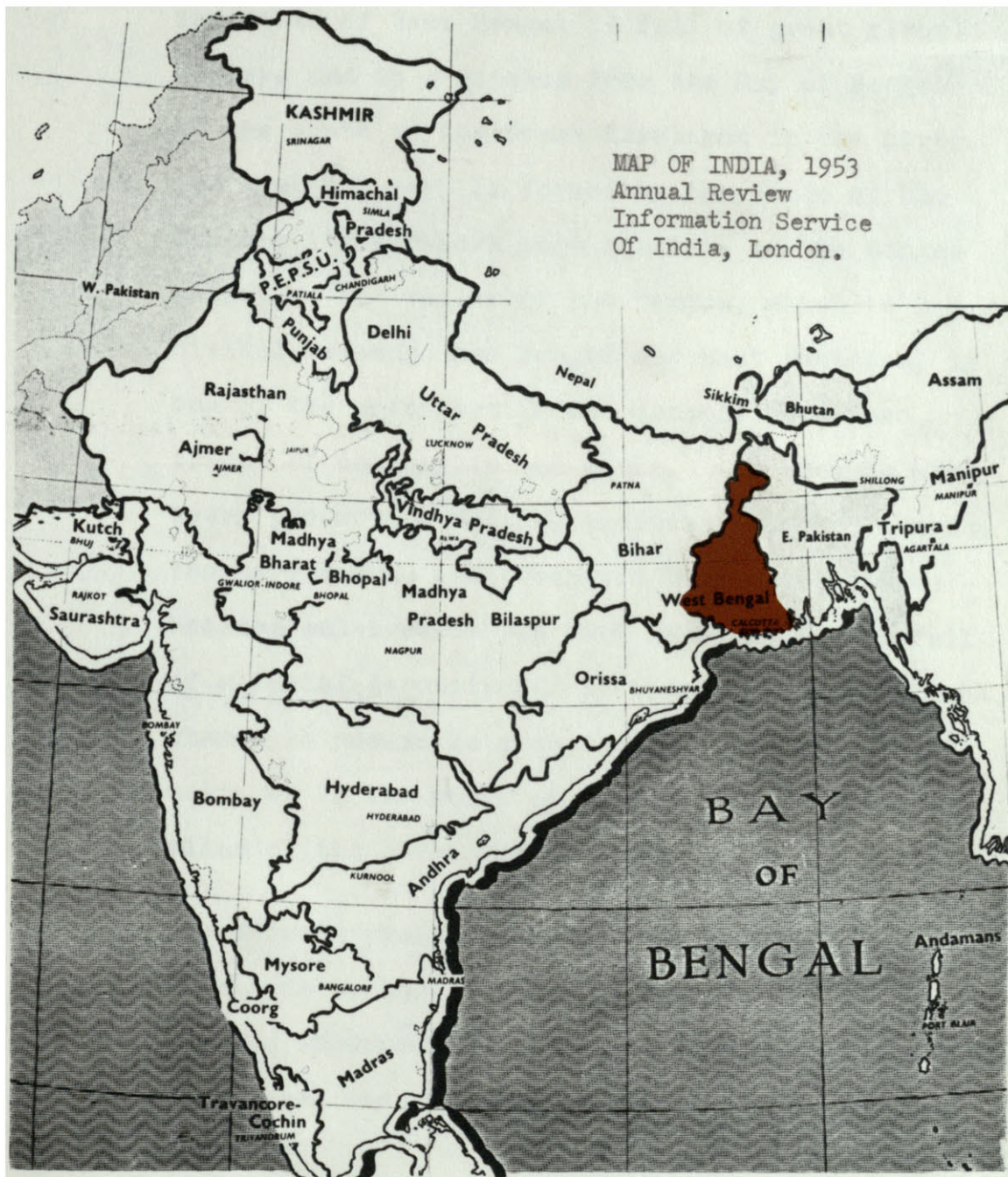
I respectfully submit herewith this thesis
entitled "A Housing Pattern for Present-Day
Rural West Bengal," in partial fulfillment of
the requirements for the degree of Master of
Architecture.

Very sincerely yours,

V. Sundareswaran

ACKNOWLEDGMENT

The author wishes to express his sincere appreciation to the Faculty of the School of Architecture and City Planning for their valuable assistance and advice in the preparation of this study.



PHYSICAL CHARACTERISTICS

The State of West Bengal is full of great river valleys and it stretches from the Bay of Bengal in the south to the Great Himalayas in the north. Its southern part is formed by the delta of the Ganges; its northern part consists of the Ganges valley. The valley of the Ganges, which is now divided between West Bengal and East Pakistan, is one of the most fertile and densely populated tracts of country in the world. It abounds with every product of nature, including timber from the feathery bamboo and coroneted palm to the iron-hearted sal-tree. The land near the sea is full of alluvial deposits and it is stated that no substance so coarse as gravel occurs throughout the delta or in the heart of the state within 400 miles of the river mouths.

The climate varies from the snowy regions of the Himalayas to the tropical vapor bath of the delta. Seasons supposedly change here every two months and thus there are six seasons marking each year, as follows:



A VILLAGE IN BENGAL
Photograph by Anthony Denney

Warm and Humid conditions	April	-May	'Grishye'	Summer
	June	-July	'Barsha'	Monsoon
	August	-September	'Sarat'	Autumn
Temperate conditions	October	-November	'Hemanta'	Winter
	December	-January	'Seeth'	Spring
	February	-March	'Basanta'	

The following data, again, which are available for the areas in the region of Calcutta, will give an idea of the weather conditions in other tropical areas of the State:

Average maximum day time temp. in May	104°F
Average maximum night time temp. in December	51°F
Maximum day time average for March-October	95.5°F
Minimum night time average for March-October	72.4°F
Average maximum temperature for winter	85.6°F
Average minimum temperature for winter	52.3°F
Normal rainfall	63.4 in.
Number of rainy days in 1945	82 days

Thus, persistent warm conditions with a small range in temperature and high humidity prevails most of the year which makes fully ventilated buildings as open as possible to any cooling breeze, a necessity for comfort.

INHABITANTS

Out of a total Indian population of 360 million people distributed in all over thirty states, the state of West Bengal is inhabited by about 25 million people in an area of 29,476 square miles, with a density of 806 per square mile. About 76 per cent of these people live at present in the rural areas of the state and nearly 57 per cent of the total population have their major income from agriculture. The inhabitants of this region are mostly of the Indo-Aryan origin and their history dates as far back as 1500 B.C.

Life in Bengal, as in all other Indian states, is strongly influenced by the old Indian social structure and all of the three concepts of a traditional social setup - namely, the autonomous village community, the caste, and the joint family system work even today within the Bengali community, though to a lesser degree. In all three it is the group that counts; the individual has a secondary place. The old Russian mir was somewhat similar to the old Indian village community. Caste has been based mainly on functions similar

to the mediaeval trade guilds in Europe. There is nothing in the west, perhaps, which could really be compared with the Hindu joint family system.

Caste, in its earliest forms, was much needed and desirable and meant to develop individuality and freedom, but it took a different course in its later stages and crushed the masses altogether. The joint family system, on the other hand, served to give guaranteed security to all members of the family but, again, due to its stress on the family or the group it cut down the egocentric attitude of the child and tended to develop an aptitude for socialization. The group economy suffered consequently and, when in this era of science and technology, we notice an industrial progress in the country, the change that is taking place in our society is due to certain basic economic changes which have influenced our living habits and which are likely to upset it completely. Thus, we find that the joint family system is rapidly breaking off, leading to individualistic attitudes and hence some new problems of behavior. Living conditions have changed and it is impossible for the caste system to endure any longer. What will take its place, however, remains to be seen.

Family Composition:

According to the recent census report, the average family in West Bengal, as in most other parts of the country, consists of 5.5 persons. This figure has reduced to 5 for the sake of this study and it is expected that with the present trend in the growth of industry and mass education that the joint family will break off more rapidly and the family size will consequently decrease. Again, it is assumed that a family will consist of the head couple, with either three children or with two children and one of the grandparents or other relatives.

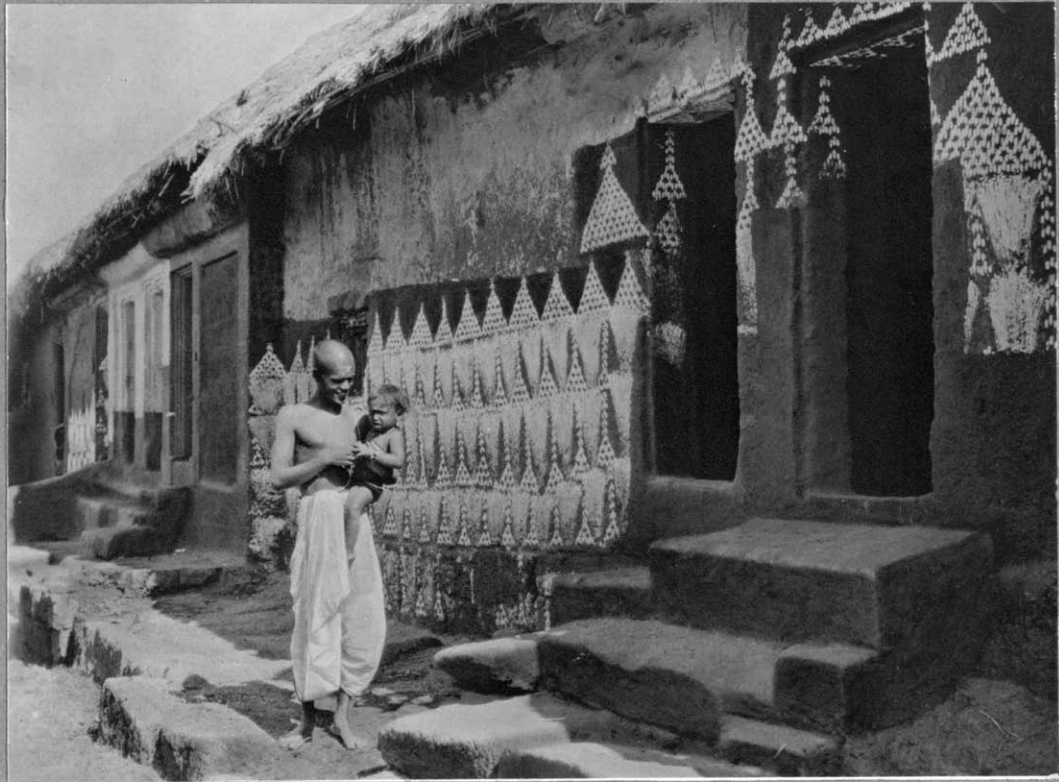


A BENGAL HUT
Photograph by Anthony Denney

DESIGN CONSIDERATIONS

Present Condition of Houses:

1. There are at present various types of houses in Bengal villages built of thatch, tile, brick, mud, bamboo and timber.
2. These houses are usually of the single-room type built with cheap local materials such as mud, bamboo and thatch.
3. These houses are usually overcrowded and poorly ventilated, too.
4. The structures are usually temporary, without being waterproof.
5. Small openings without shutters usually characterize these houses.
6. These often have a low roof.
7. Being of one-room type, the kitchen facilities are often very unsatisfactory.
8. The area around the hut is usually used as a latrine.
9. Animal pets, such as cows and goats, are often kept in the houses.



A Village House painted for the New Year
Photograph by Martin Hurlimann

Housing Needs:

1. Bedrooms - at least two for a family of five members.
2. Verandahs for receiving guests in the absence of a living-room, and for sitting out as well.
3. A kitchen, and a store, if possible - or a larger kitchen to be provided.
4. Firewood store.
5. Cattlesned, if cattle are kept.
6. Wash place, privy, and refuse collector.

Bedroom Requirements:

1. Should be large enough.
2. Should be oriented North-South (being the best orientation for catching the prevailing breeze and for protection from the sun in the regions of West Bengal) and have openings on opposite walls.
3. The walls should be damp-proof and should be protected from the sun with deep overhangs.
4. The floor should be smooth, preferably, and easily cleaned.

5. The roof should withstand the heavy rains.
6. Beds should be raised from the floor, preferably.
7. Due to alternate rain and bright sunshine generally, there should be provision for opening and closing windows, if necessary.
8. There should be provision for keeping clean clothes.

Verandah Requirements:

1. In the absence of a real living-room in a minimum house the verandah should be designed for sitting out in relation to a garden and given some privacy.
2. The kitchen should have a sort of work verandah attached to it which may be covered or open in a tropical climate.

Kitchen Requirements:

1. Should be covered for cooking during wet weather.
2. Structure needs to be stable enough.
3. Should be large enough to store food in the absence of a food store.

Store Requirements:

1. The store is usually used for firewood storage.
2. Should be near the kitchen.
3. Should be covered to keep out the rain.

Care of Animals:

1. Animals and fowls may preferably be kept out of the houses.
2. They should have their own shelter suited to their needs with water, drains, and food-boxes. These shelters should be well ventilated.
3. Animals should have proper grazing areas away from the village housing area.
4. Fowls should have proper fowl houses. These may also be away from the houses and near other animals.

Design of Clothes-Washing Places:

1. In the case of minimum housing it is preferable to have communal washing places near the source of water supply or near groups of houses.
2. Communal wash places may be designed preferably

with basins with room beside them for soap and other supplies. The floor should drain itself and be of hard material.

3. The economy of washing in a basin of soapy water should be demonstrated.

Personal Washing Places:

1. Under present economic conditions, well maintained tanks or other sources of water supply could serve as bathing places.

2. Bathing ghats should be planned with separate sections for men and women and with changing rooms for both sexes.

3. A wash place could be provided in each house which could be used both for personal and clothes washing with water brought from a nearby well or tank.

Latrine, Refuse Disposal and Wash places:

1. In the loose, clayey soil of West Bengal the most efficient system of working a latrine will be through a septic tank. In a large housing scheme, this could be done preferably and more economically

through an Imhoff's tank. The provision of such a tank enables a closer grouping of houses. They require little upkeep and are clean.

2. Refuse bins should be provided for both waste fit for feeding animals and composting and also for waste for incineration, etc.

Garden Requirements:

1. The use of an airy, well-kept garden should be more emphasized in the case of a minimum house.

2. The gardens are of two kinds - the pleasure garden and the work garden.

3. The pleasure garden could be planted with flowers and ornamental trees, shade trees, fruit trees - and used as open-air sitting and children's play area.

4. The work garden may house the privy, the fire-wood store, the kitchen, and a vegetable garden.

Village Planning:

1. Water supply may be from wells, boreholes, pipe-borne wells, dams, or streams.

2. Swamps, stagnant ponds, and other marshy areas should be avoided.
3. The size of the village in relation to its people and animals have to be considered. This would avoid over-grazing of certain areas. Extra population should be removed to other districts.
4. Deforestation should be taken care of and erosion prevented with encouraging tree plantations for firewood, shade, fruits, flowers, etc.
5. The village should receive sufficient fresh air and be sited to evade storms and winds.
6. A beautiful scenery should be given preference in the choice of a site.
7. The villages should have the main road reasonably near.
8. They should be set back at least 100 feet from the main road.
9. There should be few access roads from the main road.
10. The village center should be on the central village axis near the main road.

12. The village housing consists of the groups of houses with other communal facilities such as public squares, tanks, washing places, schools, etc.
13. All areas should be planned with room to expand.
14. Housing should be oriented properly to catch the prevailing breeze.
15. Natural views should be taken into account in laying out villages.
16. Drainage will have to be taken care of, especially in a marshy region like West Bengal, by properly sloping the site and making use of the least natural slope in the original site.

TOWARD A SOLUTION

Rural House:

Area: 800 sq.ft. built up.

The plan is designed to include:

- (a) Two large rooms (9' x 14'), both of which could be used for living during the day and for sleeping during the night.
- (b) A large verandah facing a fenced court, the fence being a high but lightly designed bamboo structure.
- (c) A well-ventilated kitchen (10' x 9') opening into the verandah and easily reached from the two rooms.
- (d) Work area attached to the kitchen and enclosed by a fence.
- (e) Wash space.
- (f) Privy.
- (g) Drying area for wet clothes near the wash space and in the open.
- (h) Vegetable garden near the kitchen and other service area.

The houses are placed North-South so that all of the rooms have good access to breeze and protection from the sun. The major rooms have provision for venting off hot air at ceiling level. The kitchen is placed so that smoke and odors are not likely to affect the rest of the dwelling. Wash and privy are approached from outside and in the scheme this enables the grouping of privies to reduce the cost of plumbing. Also, the use of the privy as an intimate part of the house is strange to local conditions and the idea will be a sort of forcing upon the people at this stage.

The house uses three materials, bamboo, clay, and salwood, which are available locally or can be grown easily near any Bengal village. These materials have always been used in the past in old houses and as such the skills used are traditional.

The house planned here is comparatively large in relation to the usual houses planned under the Government-sponsored community projects. In the rural-urban townships built under such schemes, the different types of houses are classified as follows:

Out of a thousand houses built in the rural-urban town,

750 type common	-240 sq.ft.
150 type middle	-300 sq.ft.
80 type special	-400 sq.ft.
20 type special	-600 sq.ft.
1000 latrines and 1000 bathrooms.	

But these houses are usually built with materials such as corrugated iron sheets, poorly burnt inferior bricks, or unseasoned wood that are considered to make permanent housing. However, these houses can hardly be expected to last twenty-five years. Yet, there are many clay and bamboo structures in the region of West Bengal which are of 40 years of age. With other materials again, the net area of the house is far from being a minimum and the use of less expensive bamboo and clay could make possible a larger area for the same total cost.

The rural house uses materials as follows:

Lower portion of walls: Woven split bamboo, between two layers of treated clay.

Posts: Branches of sal trees or bamboo.

Roof: Hand or machine-sewn small-size timbers.

Roofing: Inner layer of clay mud covered with oiled paper; the whole between two layers of split mulli bamboo.

Floor: Bamboo poles finished with earth and cowdung in the major rooms only; earth and cowdung in the kitchen, store, privy, etc.

Doors and windows: Split and woven bamboo.

The roof is of such design that any part of it can be repaired independently. All repairs can be made locally by the owner himself.

In a planned community of these dwellings, these houses can be grouped in fours around a courtyard so that the major rooms will all face either North or South. The courtyard scheme works around the group idea which has so strongly influenced the Indian society in the past and it attempts to bring out some of the advantages which have come out of such a society. This sort of group living, apart from giving enough privacy to each family, tends to keep a sort of intimacy amongst the different families.

This scheme can be extended further by connecting two such units together whereby the two courtyards flow into each other in an informal way. Several of these units can be joined in a row to form the village housing group.

One of the outstanding features in this scheme is the idea of the high bamboo fence all around the houses; this is for two main reasons:

(1) Inasmuch as the importance of a courtyard in a minimum house is realized, a high fenced court makes it more a part of the house. Low fences in recent housing schemes have not served their purpose whereas the high fence would signify a better use of the space. Again, this idea is not new within the local communities and there are many houses in Bengal with high-walled courtyards built of brick and other materials.

(2) The fence idea shows in an abstract way the group consciousness that prevails within the village community.

Each group of houses is served by a residential street from the main secondary street. The residential streets open out into bigger public squares with-

in the housing area and these squares serve as meeting places and children's play areas during the evenings. The series of courtyards in the whole scheme change in scale and they flow into one another in an informal way. This method attempts to break the monotony of an otherwise identical housing group. The exciting effect of a change in scale when an individual walks through one of the small lanes and comes out into a big plaza is to be particularly noticed. The series of big squares which are also connected open out at one end into the common public tank and at the other end into the big village common.

The Village:

It consists of the village center with the groups of houses around the center and the farmlands beyond the housing groups.

The village center includes the market and the shopping center, the bus and the cart terminal, the police station, the public administration, the post office, the village hall, the secondary school, the cottage industry training center, the public park with the tank, the open-air auditorium, the health

center and the playgrounds in connection with the school. In the layout suggested for such a civic center the village center is planned along the main traffic road but set back from the main road with a patch of green about 100 feet wide so as to allow for future extensions along traffic roads. Besides, this arrangement serves to keep the villagers away from the busy traffic along the main highways. This green space need not be wasted. It can be used for gardens, for sitting-out spaces under trees, for planting various types of trees, etc.

The bus and the cart terminal and the loading and unloading facilities for the market and the shopping center are all planned alongside the main road so that these will not conflict with the rest of the pedestrian circulation within the center. As we approach the center along the village secondary road we come into the big village square with the village hall and the public administration building with the big tank forming the focal point. The secondary school, the cottage industry training center and the shopping center also face into this plaza with the open-air auditorium in between. The health center is on the other side of the road facing into a quieter

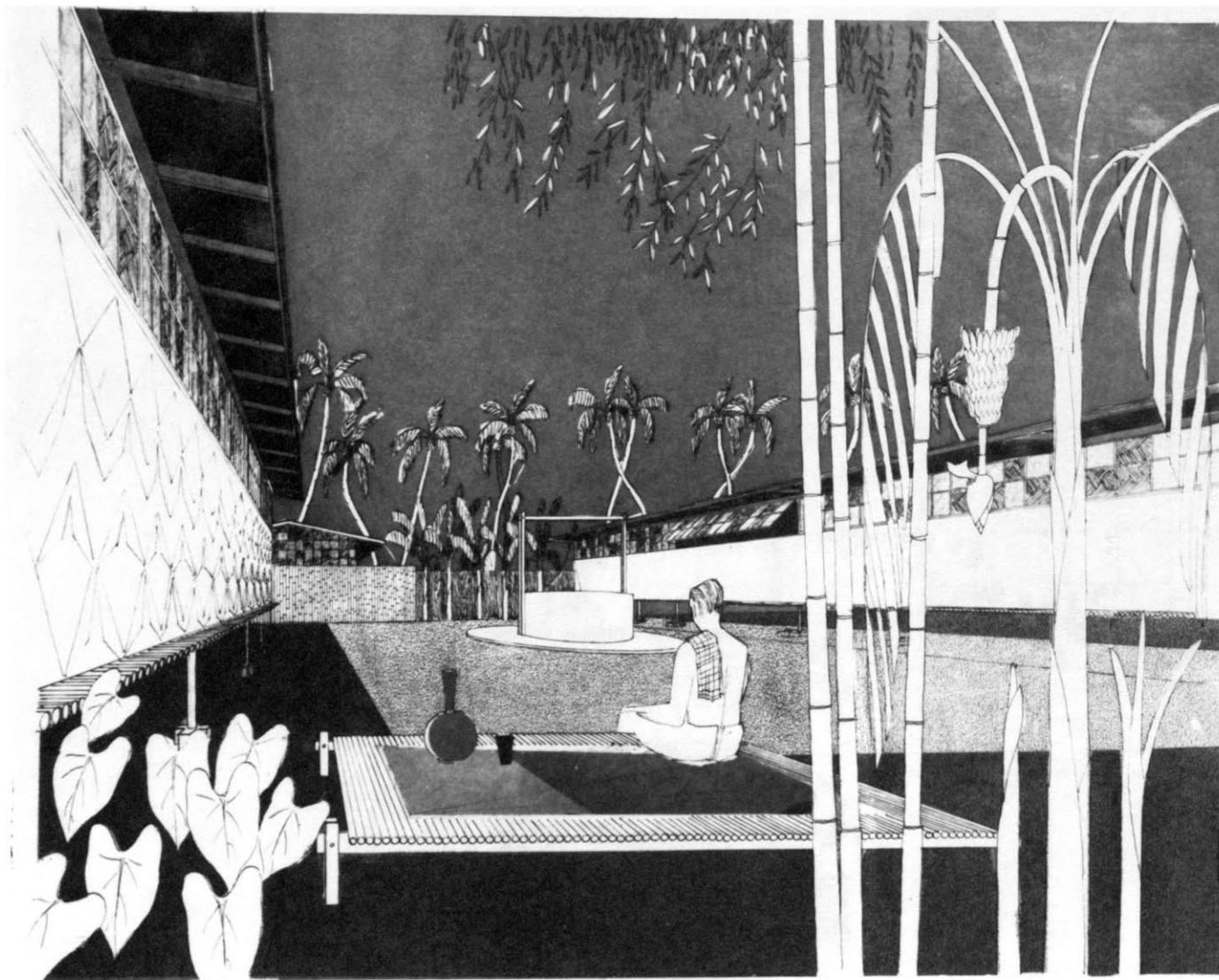
area and it makes use of the buffer space between the main road and the village siting. The village hall, the secondary school, and the cottage industry training center on their rear open out into a large green which serves as the village common and as playgrounds in connection with the schools. The various housing blocks are arranged around this large green.

CONCLUSION

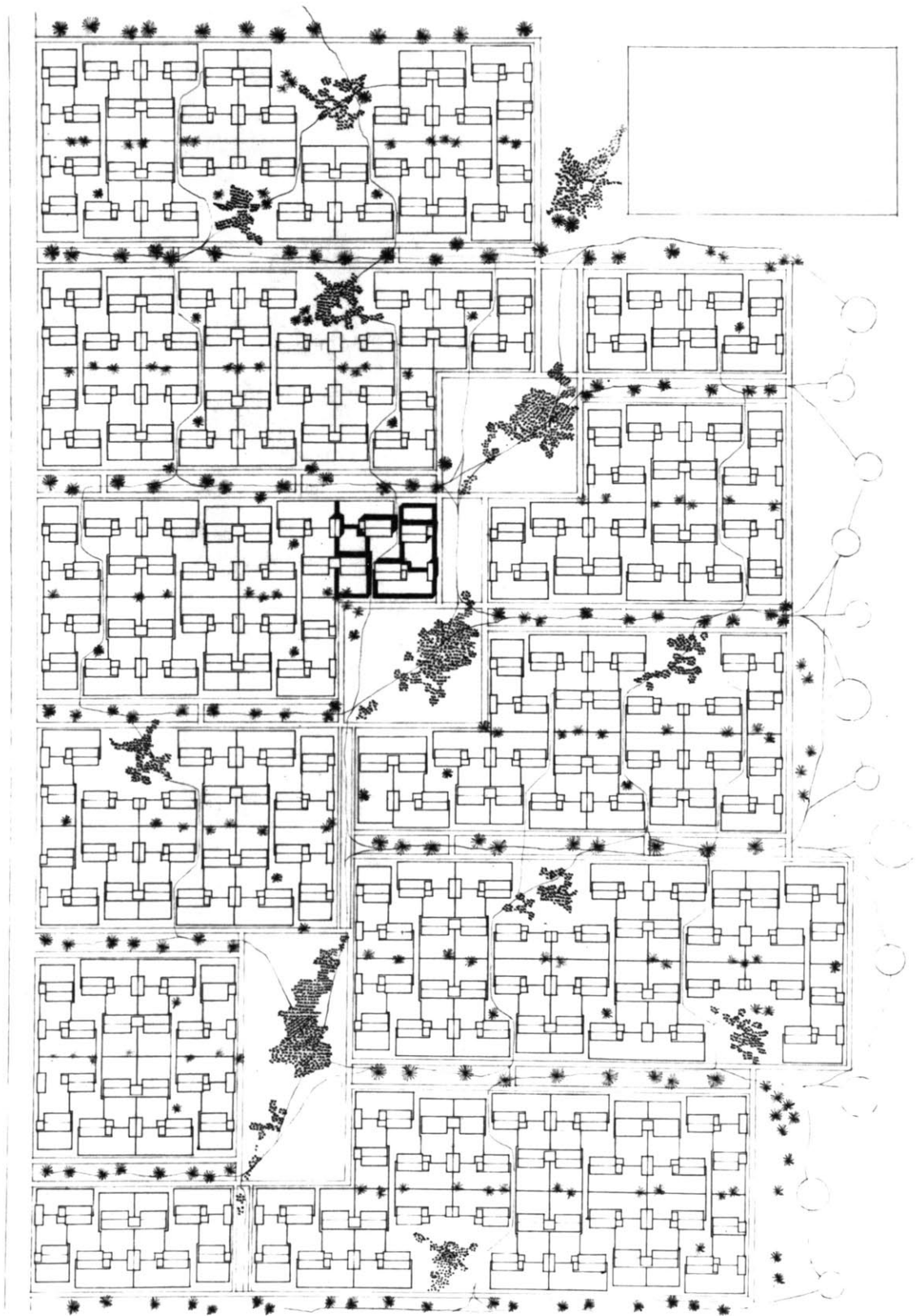
Life in Bengal, and generally all over India, has been influenced, in the past, purely by a rural economy which has lent a stable character to the whole society, but, on the other hand, it has led to a passive attitude towards the material aspects of life which has deprived it of its dynamic character. So, in this era of science and technology, when we are passing through a series of changes both in our economic and social patterns, we must look to some of the lessons of our own past as well as that of the west wherein the fast pace of an industrial revolution has given birth to certain new problems of behavior within the society. Housing, in the future, will have to take into account these factors in improving living conditions and changing existing patterns of life in order to fit in with a progressive national economy.

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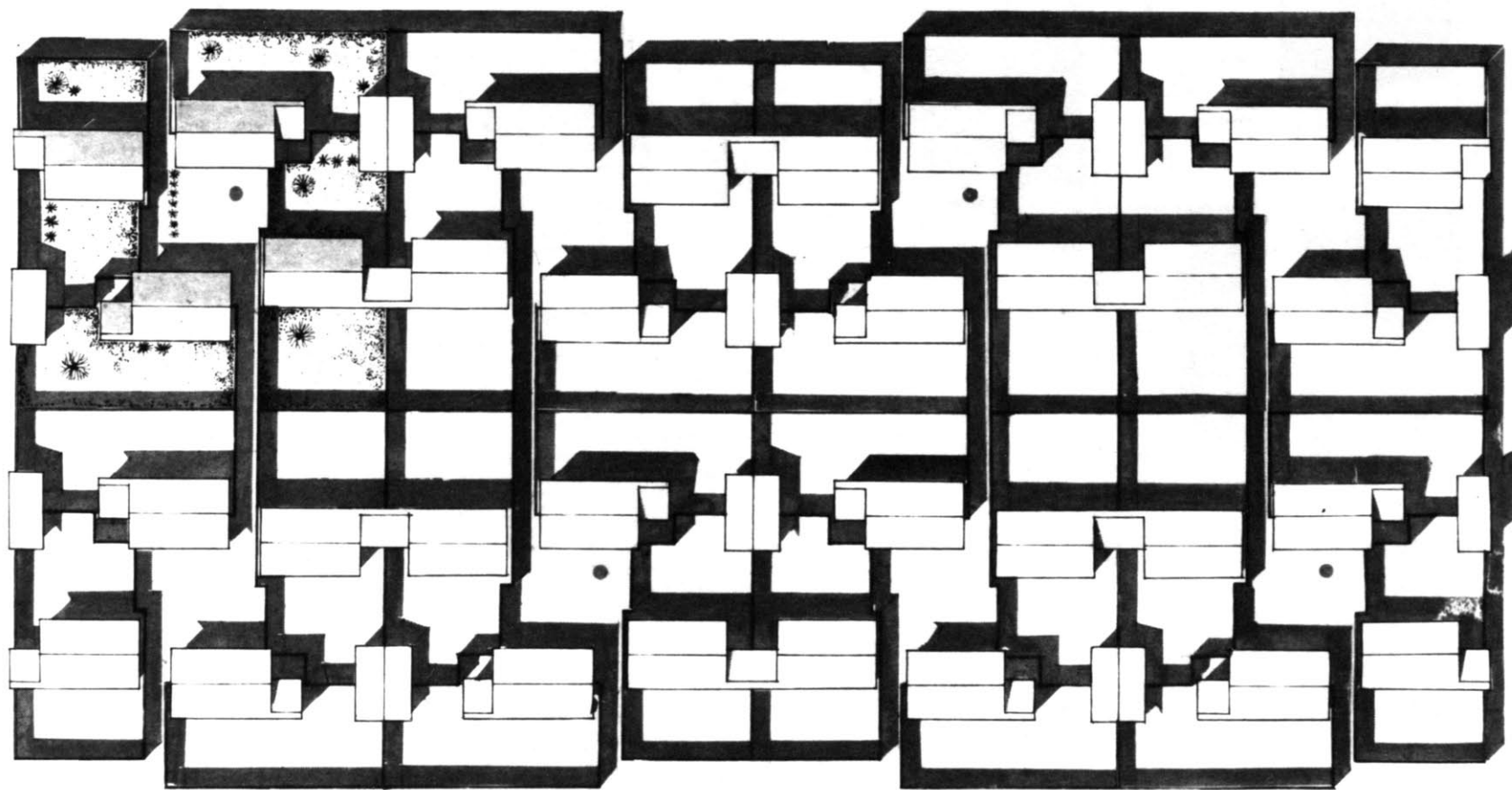
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5. Two Low-Cost Houses Department of Archi-
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 College, Calcutta
6. Economic Gains Through
 Planning Joseph Allen Stein
7. INDIA, the landscape,
 the monuments, and the
 people Martin Hurlimann



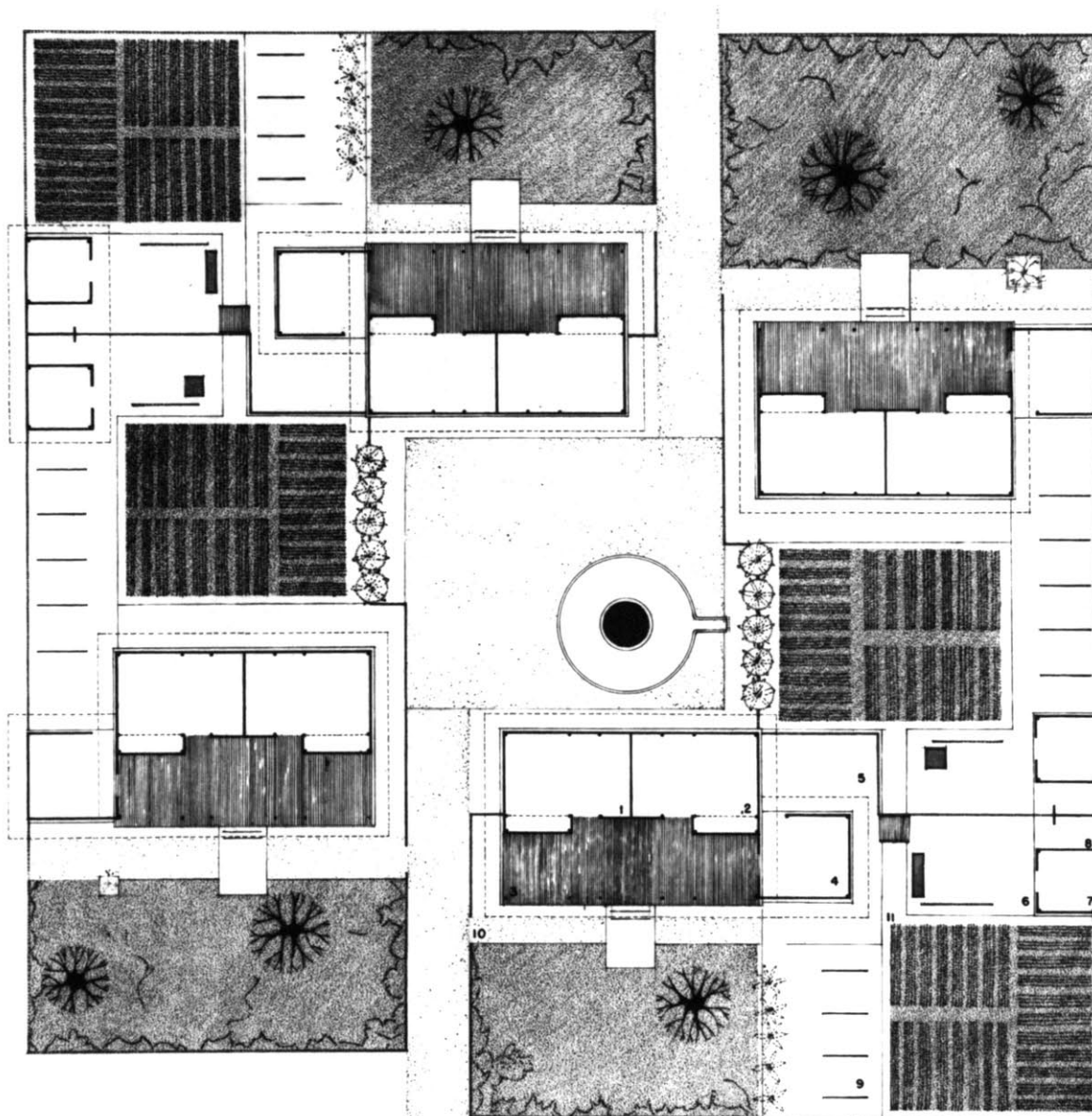
VIEW OF THE COURTYARD



TYPICAL HOUSING BLOCK

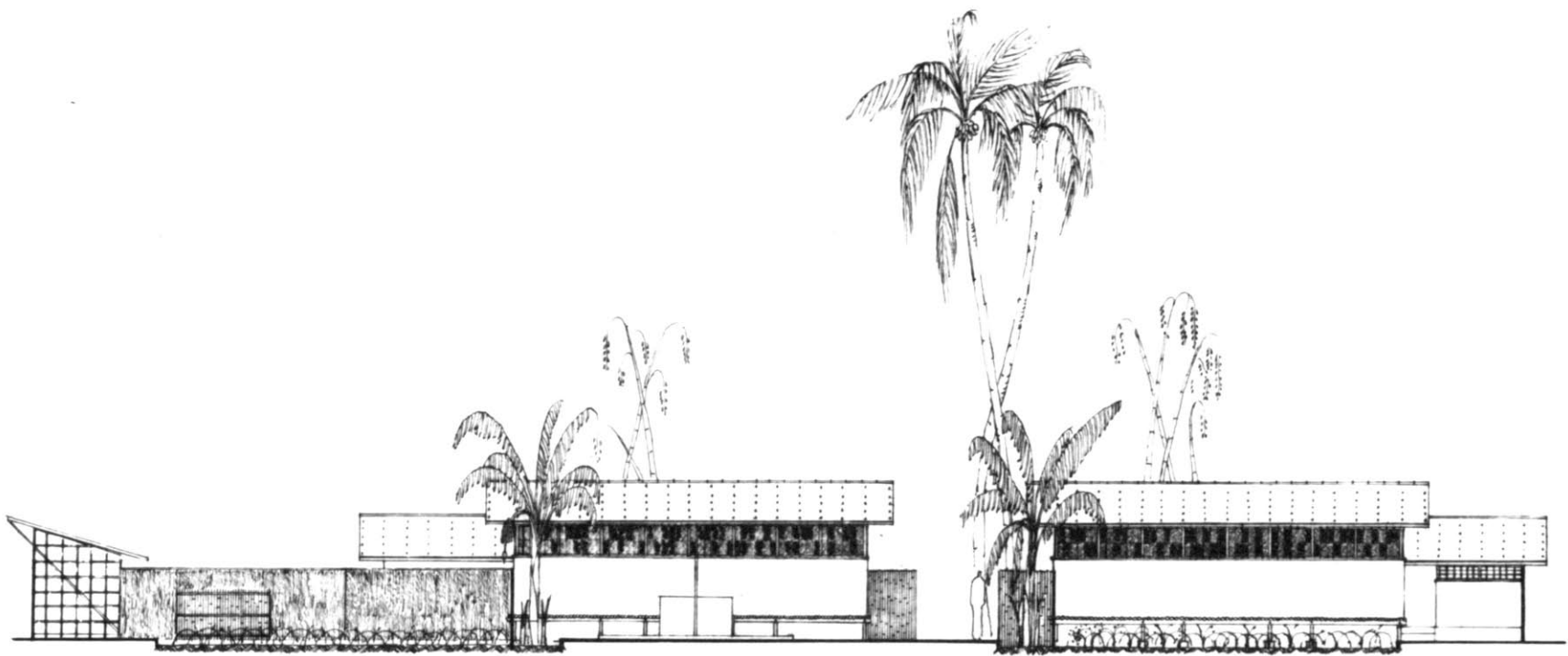


TYPICAL HOUSING GROUP

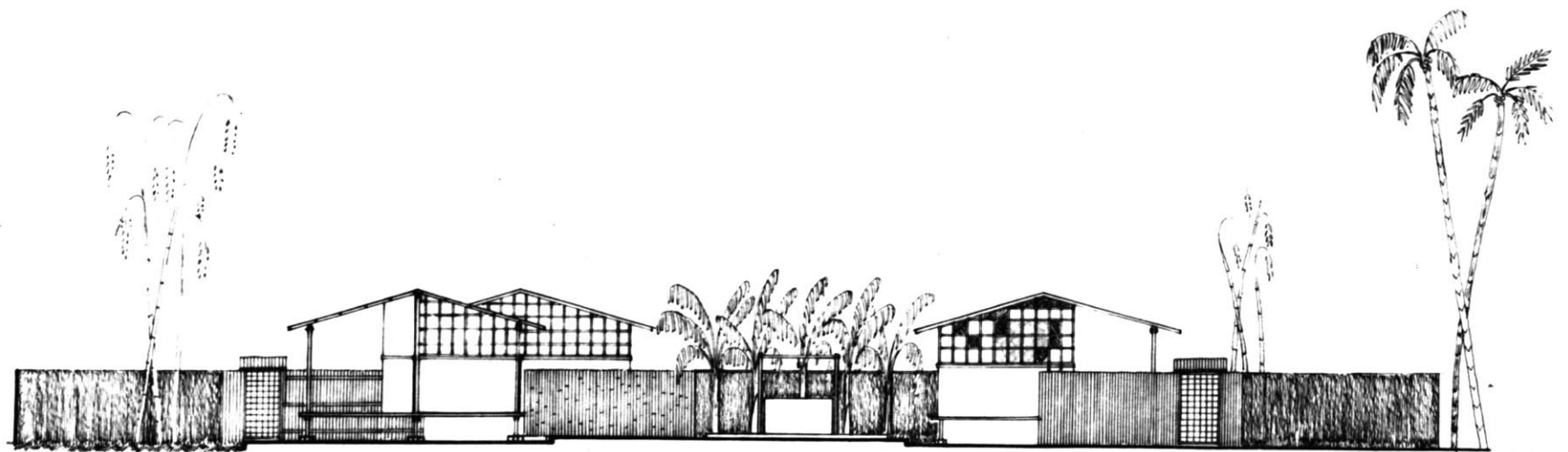


TYPICAL HOUSING UNIT

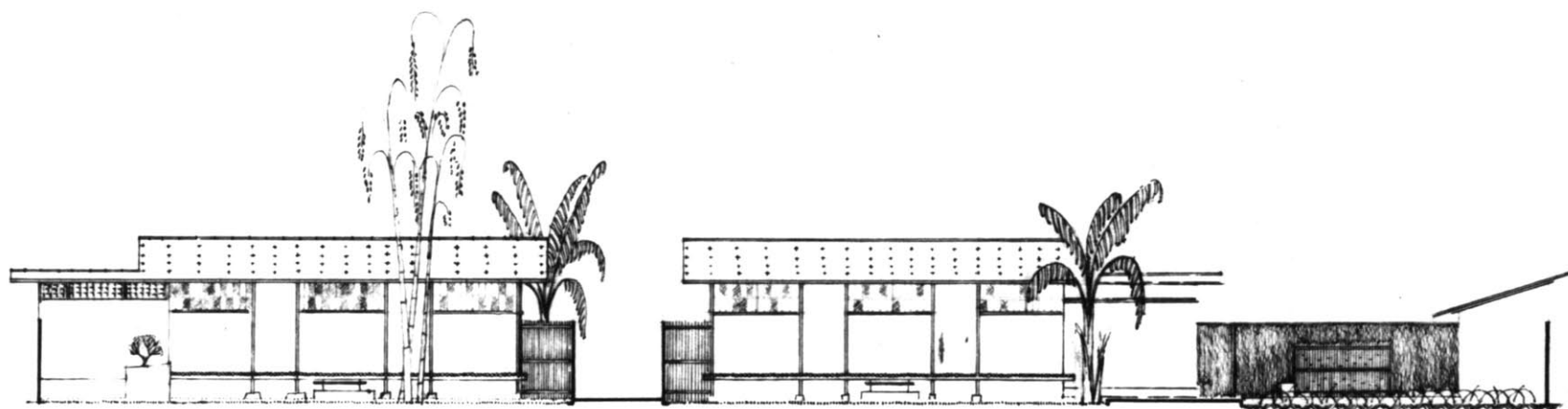
- | | |
|----------------|----------------------|
| 1 - BED ROOM | 7 - FIREWOOD STORAGE |
| 2 - BED ROOM | 8 - PRIVY |
| 3 - VERANDA | 9 - DRYING YARD |
| 4 - KITCHEN | 10 - LIVING GARDEN |
| 5 - WORK AREA | 11 - KITCHEN GARDEN |
| 6 - WASH PLACE | |



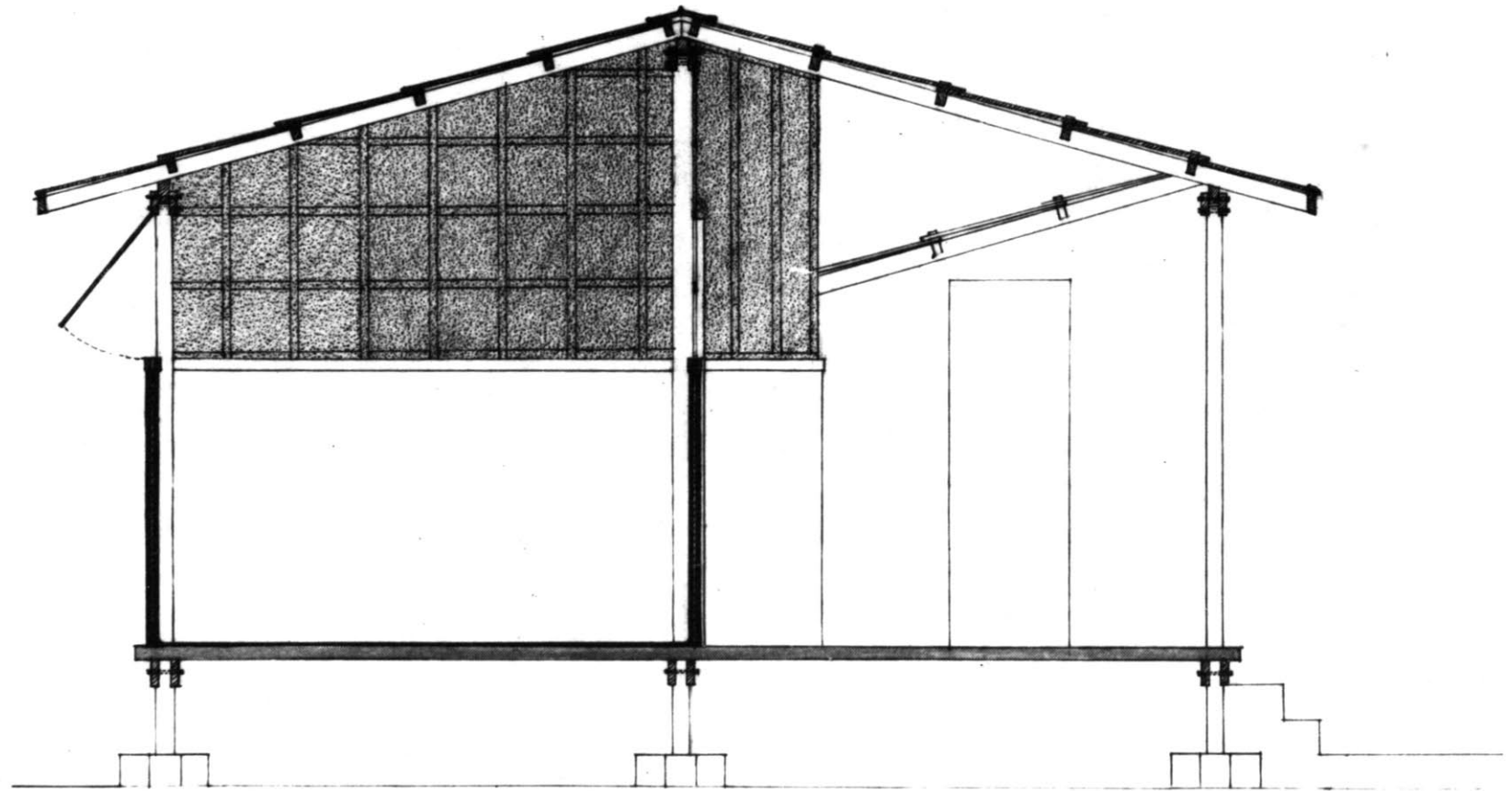
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SECTION C-C

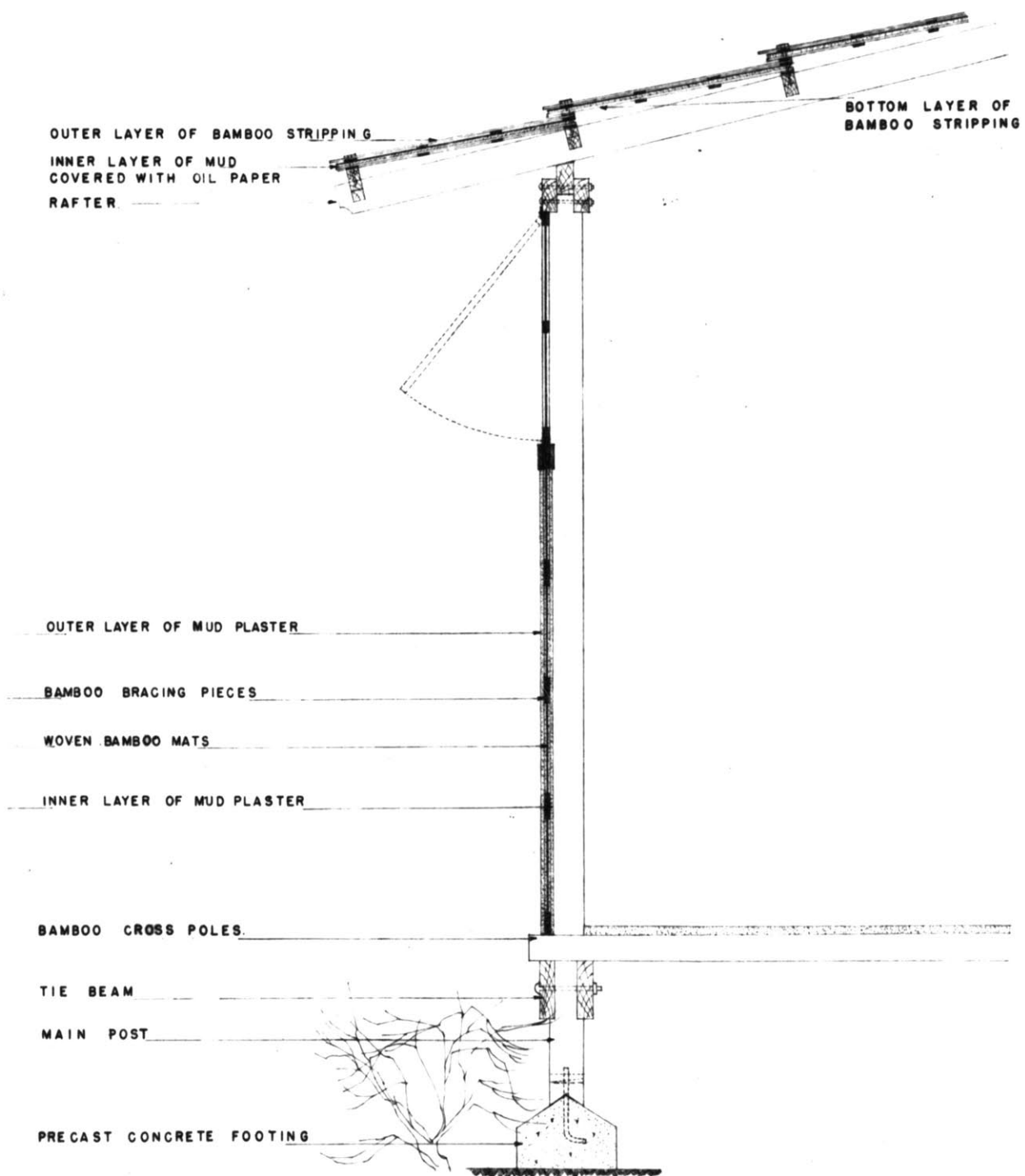


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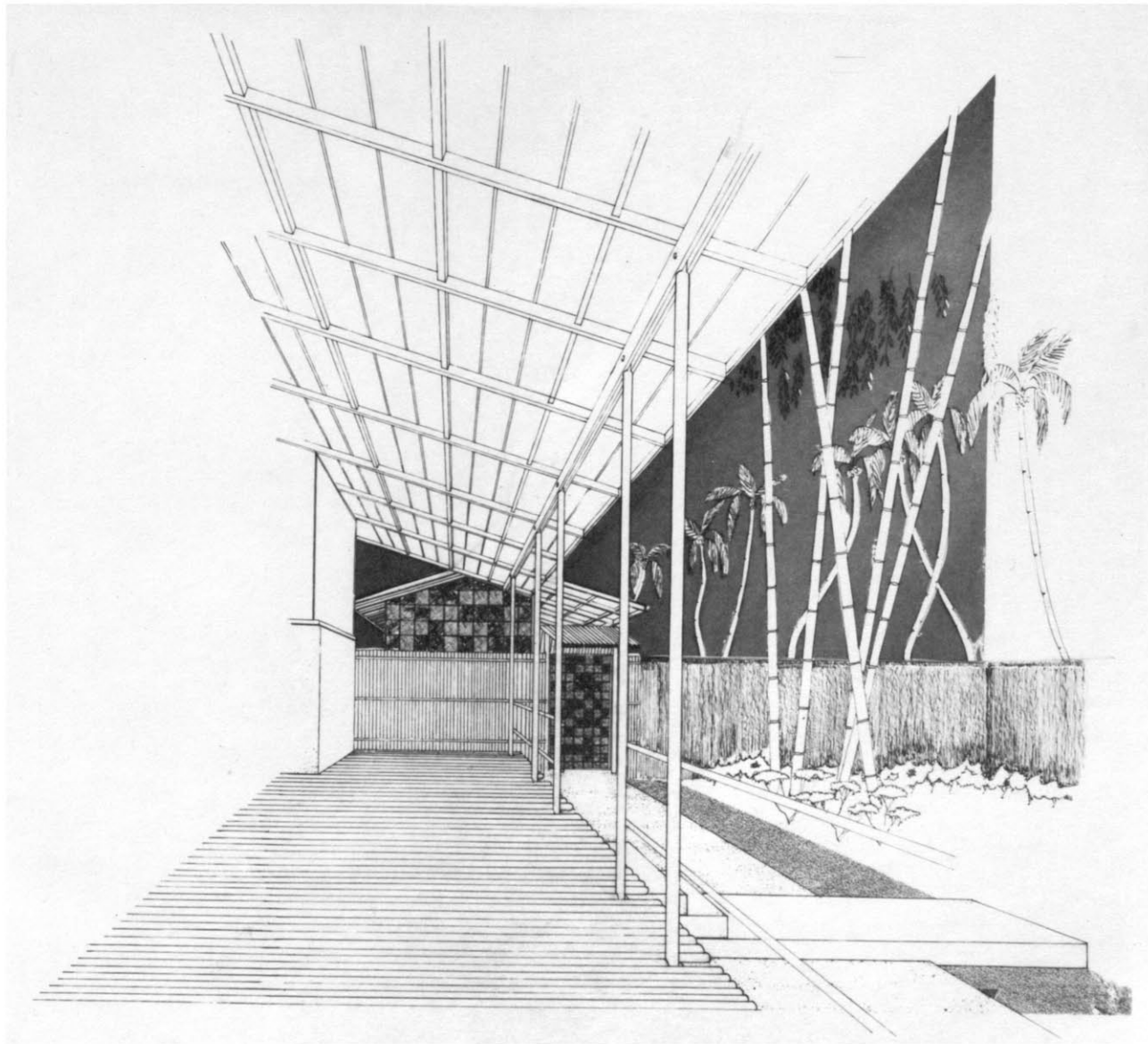
SECTION - BEDROOM & VERANDA.

SCALE - $1/2" = 1'-0"$



SECTION

SCALE - ONE-EIGHTH FULL SIZE



VIEW FROM A TYPICAL PORCH