

NEW AGRICULTURAL SETTLEMENT FOR
THE PALESTINIAN REFUGEES IN THE
BEQAA DISTRICT
NASIR, MICHEL SALIM
1952

Epsn 111

NEW AGRICULTURAL SETTLEMENT
FOR
THE PALESTINIAN REFUGEES IN THE BEQAA DISTRICT

A Thesis for the Degree of Bachelor of Science
in Civil Engineering

By

Michel Salim Nasir

American University of Beirut

May, 1952

C O N T E N T S

	<u>Page</u>
Foreword	1
Introduction	1
Location and Characteristic of Al Beqaa Plain	5

P A R T I

I. Planning of the Village	
(1) Description of Land	8
(2) Subdivision of Land	8
II. Streets and Street System	
(1) Introduction	10
(2) Description	10
(3) Street System	11
(4) Widths and Cross-Sections	11
(5) Street Intersection	12
(6) Traffic Control	12
III. Recreational Facilities	13
IV. Playgrounds and School	15
V. Business and Civic Center	17
VI. Cooperative Society Center	18

P A R T II

VII. Architectural Design and Details	
(1) Introduction	20
(2) Building Materials	20

VIII. Architectural Details	<u>Page</u>
(A) Houses	22
(1) Type A	
(A) Description	22
(B) General Details	23
(2) Type B	25
(3) Barns	27
(B) School	29
(C) Health Center	31
IX. Statistics Relating to House Building	33
X. Bibliography	34

FOREWORD

FOREWORD

It is a pleasure to express my great indebtedness to Prof. Manasseh - American University of Beirut, and Prof. Maksoud - American University of Beirut, for their helpful suggestions.

I N T R O D U C T I O N

As a result of the establishment of the state Israel, more than three quarters of the Arab people of Palestine has taken refuge in the neighboring Arab countries. About one seventh has taken refuge in Lebanon. The majority of these refugees did not find proper places to take shelter in, so they dwelt in caves and in old tents which were unable to resist the severe cold of winter and the unbearable heat of summer. This bad situation cannot go on like this for ever. There should be serious thinking to find out healthy dwellings for these refugees to settle until the time comes for them to return to their country. This critical situation made me think to write about this case for my thesis. The main object of this proposed development is to take as many as possible of the refugees into the national economy on a permanent footing so as to add materially to the agricultural production and may be the economic stability of that region.

A second important reason which made me choose this subject and make an agricultural settlement and not an industrial one is the following. Agriculture has been and still the main profession of the Arabs all over the Arab world; and it is our main source of income. The majority of the Arabs live in villages where they work in agriculture. So it is our duty then to encourage it and make its results

more valuable, and thus increase the standard of living by centering our thinking to double the individual agricultural production in using the new agricultural machines and implements. The establishment of machinery for farming and its progress in our village depends on creating a group of skilled farmers to operate. By the use of machines the benefit must be secured to the cultivation through town-ownership with fixed charges for use.

It is difficult to establish industries for the time being, because if we look at any industry we distinctly see that its main basis are: Workshops, raw material, labors and management. On looking into each of these basis to see whether we have any of them we will be astonished to find that most of these basis are not abundantly found. But industry may develop in future if we consider each of these basis alone.

The first of these basis is industrial workshops, in other words, buildings, and machinery and this can be found easily in towns where capitals exist. The prevailing economical regulations in the Arab states made capitals gather in the hands of few people who can't by any mean consume these capitals on their personal expenses. I am sure they will not object to transfer their money to industrial schemes giving them profits ten times the same money would give if remained blocked in banks and steel cabinets. Therefore what we need is to convince these men of the advantages of such schemes to themselves and to their countries.

The second basis, the question of raw material which it is understood that they are not abundantly found in our country. But we should not forget the fact that there are very small industrial countries although raw materials are merely found in them. The best example on this is Switzerland which produces agricultural raw material only. It is considered one of the good industrial countries of the world, and it is competing other totally industrial countries. There is one thing on which Switzerland depends and that is skilled labor and craftsmen. So labor is the basis which can't be imported from outside unlike raw materials and machinery. So if we want to have skilled labor we have to create and this needs a long time.

Finally comes management and its duty to make use of workshops, raw materials and skilled labor in the best way to produce to us industries with low expenses.

To have a sound and strong nation, a village should be planned according to modern planning, and houses should be properly designed to meet all health conditions. In this new village, every family should have a house of its own. This will increase the love of the inhabitants for their village and consequently for their country.

In my opinion, and for many reasons which cannot be discussed in this thesis, the best place for this project would be in Palestine itself, near the Arab-Jewish borders. But this is met by a difficulty which is due to the lack of proper agricultural land at the borders.

But assuming the Lebanese government wishes to shelter as many as possible, the Beqa'a plain with its good agricultural soil and excess of water and its low density of population is chosen as the best available place for such a project. This village has an area of 410 donums and is planned to populate around 2500 persons. This amounts to an average of about 6100 persons in a square kilometer which is a good average. Inside the village there will not be any public agricultural land except the private gardens in houses. The public agricultural lands will be outside the village and not shown in plan.

The rectangular design of houses is adopted. Buildings are mostly of the row type. The row system is chosen so as to economize materials as much as possible; and economy in such a case is of prime importance. Houses and other buildings are to be built of the local building materials available in that region except the school and other public places ^{which} are to be built of building materials other than the local ones, such as building stones and reinforced concrete. The village will have modern irrigation, water supply, sewage and electricity system.

LOCATION AND CHARACTERISTIC

OF AL-BEQA'A PLAIN

The Beqa'a is a long, relatively narrow valley, about 12 miles across at its widest point, running north and south between the Lebanon and Anti-Lebanon mountains. It lies at an altitude of about 3000 feet.

From Beirut it ^{is} entered from Chtaura on the Beirut Damascus road.

Rainfall in the center of the plain averages around 32" - 34" per year. As elsewhere in Lebanon, it all falls during winter. The summer is rainless.

From Chtaura and Zahlé northwards up to Baalbek, the plain is wide and the land is fertile, it is also treeless and very suitable for mechanised farming. It is said that 27 tractors and 7-8 combine-harvesters are working on the plain. The chief winter crop is wheat or barley. In occasional fields, Legume is grown.

In summer the crops are melon, potatoes, ^{maize} maize or millets (according to the presence or absence of irrigation) and some others. Grapevines are plentiful, especially near the hills.

Abundantly rich with water, irrigation is practised there from immemorial times. Yahfoufa's river irrigates the plain of Rayak-Sarain; the waters of Ammik which constitute a swampy zone in winter,

are used for the irrigation of summer crops; the waters of Anjar, Ras el-ain are canalized and used for the irrigation of Cereals. X

↓ Having so many fountains and rivers springing from the foot of the hills and running down to the plain, many orchards are set up with plenty of apricots, plums, apples and cherries grown in them. But due to the low density of population these orchards are centered around the principal localities: Kabb-Elias, Zahlé, Rayak, & Hermel.

The arable lands of Lebanon, and especially that of Beqa'a which constitute the largest portions, supply much of the food on which the well-being of the nation depends. They furnish the raw materials for many of the country's industries. From these come the products that form the greatest part of Lebanon external trade. About two thirds of its population earn their means of livelihood on these lands. They are therefore Lebanon's most important natural resource and on their proper development will depend the future prosperity.

The main areas of lands *Plain Lebanon* suitable for arable agriculture are the following: (1)

	<u>Estimated Area</u>
Plain of Al-Beqa'a.....	125,000 Hectares.
Plain of Akkar.....	12,000 "
Littoral from Tripoli to Beirut.....	10,000 "
Littoral from Beirut to Tyre.....	13,000 "

(1) Report by A. Gibb and Partners, The Economic Development of Lebanon, p.42, 1948.

Considered from Hermel till Joubb-Sannine, the Beqa'a has a population of 158,000 inhabitants, an area of 4,427 sq. kms, and a density of 36 inhabitants per sq. km.

Density of Population, 1944 (1)

<u>Mohafazat</u>	<u>Population</u>	<u>Area in sq. km</u>	<u>Pop. /sq. km</u>
Beirut	237,000	18	13,000
Mount Lebanon	272,000	1951	139
North Lebanon	227,000	1959	116
South Lebanon	170,000	2045	83
Beqa'a	<u>158,000</u>	<u>4427</u>	<u>36</u>
Total	1,064,000	10400	102

Its population is distributed among towns and villages as follows:

<u>Mohafazat</u>	<u>Pop.</u>	<u>Urban</u>	<u>Percentage</u>	<u>Rural</u>	<u>Percentage</u>
Beqa'a	158,000	21,000	13%	137,000	87%

This fertile plain of Beqa'a is one of the five mohafazats which constitute the Lebanon. Its area is nearly half the total of the whole country; and its arable lands are nearly four times the arable lands which are found in the rest of the four mohafazats.

(1) Ibid., P. 30, Table Nos. 3.

PLANNING OF THE VILLAGEDescription of Land

It lies between Beirut - Damascus road and Ghazail river in a place called Anjar in the Beqa'a district. The latitude of the place $33^{\circ}-30'$ and the longitude is $35^{\circ}-50'$. It has an area of 410 donums. The land slopes gently towards Ghazail river in such a way that the difference in elevation between two points 200 meters apart is one meter. The soil is ordinary loam which does not effect the health of people.

Subdivision of Land:

In the subdivision of land care is taken to make use of the existing roads as much as possible. The main street 20 meters wide is in alignment with an existing street 10 meters wide. Even the street on the left hand when one enters the village approximately is in alignment with an existing street. Most streets are so designed to serve the needs of traffic for the general public, while others merely are opened up for pedestrians for direct access to individual homes. Streets are laid out parallel to main street connected together with cross-streets.

In dividing the village into blocks the rectangular type is adopted. Because according to recent studies made by experienced town planners, those that approach most nearly the rectangular appear to be the most economical. Sizes of blocks are chosen to minimize expenses in land, roads and loss of frontage, because the least amount of frontage is lost in right-angled junctions.

Lengths of rectangular blocks are variable. The maximum

length used is 436 meters (1450 ft.) and the minimum length is 192 meters (640 ft.). The longer ones are provided with cross-walks of 4 meters wide. Widths of rectangular blocks vary from 62-78 meters, except those which contain the school, playgrounds and parks. Blocks are laid out with their longer sides parallel to the 16 meters roads, in order to give maximum frontage upon these roadways. Also the widths are on 16 meters roads. Four blocks are to be used for public parks having a total area of 21.50 donums. The one in the center of the village includes a monument in the center and a club at one end. The other three are located at the corners of the village. The business and the civic center are to be built on one block having an area of 5.5 donums. The school, playgrounds, and worship place are to be built on one block having an area of 19.50 donums. the cooperative center is located at the north west of the village with an area of 1.80 donums.

The rectangular blocks are made of two tiers of lots with a depth of 31 meters each in some blocks and 38 meters in others. the frontage of each is 16 meters. So areas of most rectangular lots are 500 Sq.M. and 610 Sq.M. While lots that have a frontage more 16 meters are larger than 610 Sq.M. On the 500 Sq.M. single family houses of two bedrooms each are built, while on the 610 Sq.M. single family houses with 3 bedrooms each are built. The first type called A is designed architecturally and structurally while the other type called B is designed architecturally.

STREETS AND STREET SYSTEM

INTRODUCTION :

" One can scarcely overestimate the importance of streets and street systems in the life of city. Upon these permanent fixtures that form the skeleton of the city plan rest the easy direct movement of the people and their supplies and in some measure also their health comfort, and economic growth. Although every thorough fare is supposed to furnish sight, air and access to properties abutting upon it and a suitable setting for its architecture, nevertheless its primary function is that of serving the needs of traffic".⁽¹⁾

DESCRIPTION :

The street layout is in conformity with the plan of the village for the most advantageous development of the entire neighbouring area. A main street 20 meters wide extends without interruption for over 700 meters from the western to the eastern village limits and then extending to the country with less width. At right angles to this street and running in straight lines along the width of the village a series of streets is laid out with a width of 16 meters and separated by different length of blocks. At right angles to these streets and parallel to the main highway and running in straight lines along the length of the village a series of streets is laid out with a depth of 16 meters separated by different widths of blocks. In addition to that 4 meters road way is made for pedestrian approximately in the middle of long blocks as it is shown in dotted lines in the plan of

(1) Principles of City Planning, chap. IV, p. 71.

the village. There is no need for adjusting the streets to the contour for reasonable gradient because the land is mostly level. The roadway will be asphalted. Trees are to be planted on each side of the main street and the street in front of the school.

STREET SYSTEM :

In this development, the rectangular or gridiron system is adopted in which blocks are longer than they are wide and run parallel to each other. This system is adopted because it is simple and most common and it conforms with the habits and needs of people. In addition to that the rectangular system requires rectangular plan of houses which is the most convenient to the people and to the engineer. In other words the rectangular system is economical from a point of view of the Eng. design and the municipality. "A city must be composed principally of the inhabitants of men and straight sided and right angled houses are the most cheap to build and the most convenient to live in" (1)

WIDTHS AND CROSS-SECTIONS :

When speaking of street widths, the distance from property line to property line is meant and not from curb to curb. The widths of roadway varies according to the service which they are to perform. The minor thoroughfares 16 meters is wide enough. Such widths provide average suitable room for roadways, side walks and passages for animals. Three lanes will be provided; two for moving traffic and one for parking The widths of these lanes is 9 meters. Side walks are two meters wide on each side of the street since a side walk 1.50 meters wide allows for

(1) Planning the modern city Vol.1, p.118.

too little of road width

a person to pass two others who are walking side by side, so such a width is adequate for residential areas. 1.50 m. left on each side of the street are provided for animals. The major thoroughfares 20m. is wide enough. Such widths provide average suitable room for roadways side walks, trees and passage for animal also. Four lanes will be provided, 2 for moving traffic and the other two for parking. The width of these lanes is 12 m. For side walks and trees 2.75 m. are provided and for animal passage 1.25m. Trees are to be planted in square lots 50x50cms. and 75cms. away from curb stone. The distance between two trees is 10 meters.

STREET INTERSECTION :

At street intersections, property line corners shall be rounded by an arc, the radius of which shall be 3 m. But curb intersections shall be radii of 6 m. Radius of curvature on center lines is 25 meters.

TRAFFIC CONTROL :

1) The simplest form of intersection is that of the right angle. When four streets meet at right angle the number of possible movements is increased and the capacity of the intersection correspondingly diminished. For such a type of crossing and for others a central island 10 m. diameter is advantageous in that it gives an orderly circular movement around it.

2) Because this area is purely residential area, it is better to control the speed as much as possible. To maintain this control, cross-streets at reasonable intervals are mostly adopted, and this arrangement obliges the driver to take care and reduce the speed when they reach the end of such streets.

RECREATIONAL FACILITIES

There is no thing in the village plan that may contribute vitally to a richer life of the people, and deserves more earnest consideration than appropriate provision for recreation.

Partly because of the way in which the need for recreation has been increasingly appreciated and partly because of the character of its service, recreation divides itself into two kinds of service. One kind supplies the needs for open space and fresh air and furnishes an opportunity for the people to see and enjoy peacefully the great outdoors nature. The other kind of service supplied by recreation offers opportunity for physical regenerations through the active use of bodies and muscles in games and play of one kind and another as provided by play grounds and play field.

Urban, yes, but how?

In connection with the effort to determine the appropriate amount of area for parks within this locality, I agree with the opinion of many city planners who favor an acreage in proportion to population rather than a flat percentage of the total area of territory to be served. Usually a minimum of one acre for each 300-500 persons in any community is a reasonable allotment for recreational spaces. In this community 860. Sq.M. for each 100 persons is a reasonable allotment because it becomes increasingly difficult as village grow larger to provide necessary areas for recreation where ever a program of future needs has not been properly planned in advance which I doubt.

Although parks may be said to serve as breathing spaces and attractive areas for refreshment to both body and mind, they are different in sizes, purposes, location and character. Parks are divided into two kinds from a point of view of size, and service. 3 parks serve

the neighbourhood and one serves the village.

I must admit that there is no natural beauty that would suggest the location of a park in this locality, so no natural beauty has been destroyed in this respect by locating the parks. Parks are located with reference to the type of recreation needed by the people of this particular community as will as with reference to the general direction of the growth of the village. The boundaries of each park coincide with street lines rather than the rear lines of lots, so that homes or other structures will face rather back upon the park.

The largest park is in the center of the village on one side of the main street having an area of 8.40 donums. A historical park is located in the center of this public park commemorating the outstanding event in the life of the inhabitants. It is located also near the school to give ample opportunity for use by the children and students. 3 others parks approximately of the same size, service and character are located outside the village. The one with an area of 4.23 donums is located at the extreme north west end of the village, and the second one having an area of 4.00 donums is located the extreme and south west of the village. The third one is located at the eastern extreme, and it has the same service & character, the area of the first two is 8.23 donums and the last one is 4.87 donums. So the total area for parks is 21.50 donums.

PLAYGROUNDS AND SCHOOL

The types of areas for play depend upon the ability of the persons served to reach the specified places. In other words the matter of the kinds of playgrounds depends upon the ages of the groups of people that are to be accommodated by any playground. The first of these groups of people is composed of children from one to five years of age. Spaces are provided for such children close to their homes as in their own back yards or in parks. The school children ranging from six up to fifteen years require facilities of their own. In addition to the grounds described above in which they share with those of other groups, they require organised playgrounds or large play fields which suit the requirement of these older children. Playgrounds connected to school that they attend are provided for their major interests. Because school grounds are logical centers for playgrounds. " From the stand point of supervision, athletic leadership, and maintenance, facilities for play enjoyed by school children upon playgrounds surrounding the school building are the most economical." (1)

The first six years of schooling are offered in the elementary school and a site is set for such a school at a maximum distance of 600 meters from the most distant homes of the attending children. In the interest of safety to the children these spaces surrounding our elementary as well as our secondary school are located well a way from the major street.

In the case of secondary school the maximum distance from the

home to the play field is 600 meters. The group of children prefer games that occupy relatively greater space. A combination of football field and two basketball fields occupy the larger division of the playfield to some extent. Football and basketball field are used sometimes by the public.

BUSINESS AND CIVIC CENTER

Assemblages of public buildings such as the administration center, health center, and the public market, form the civic center. The civic is governmental, cultural and educational in character. It contains the head quarters of the police and fire departments in one separate building, the health department in another building and also separate buildings for shops. For this it is situated as closely as possible to the center of population and close enough to good transportation facilities. In locating the civic center the needs of the individuals buildings that are to compose the groups such as the space and the approach demand are taken into consideration. The site is one of easy access to the people and suited to the purpose for which the public buildings to be erected upon it is intended. Moreover the site overlook the public park which may affect the matter of appearance and insure to the buildings plenty of light and air.

The public market is formed of 24 shops. 4 meters frontage for shops to every 104 of the population is provided.

COOPERATIVE SOCIETY CENTER

It is a general belief now especially in the Near East, that the best way to improve the conditions of farmers, both economical and moral, is by establishing cooperative movement, which is good foundation for improvement, because it teaches the farmer to help himself and others.

For every farmer there should be a private piece of land quite sufficient for him, because with ownership of land come pride and incentive of work, and the fruits of the farmer's work are enjoyed by the farmer and his family.

It is quite understood that a small farmer cannot maintain all the modern machinery needed for farming his land, and that is mainly due to his poverty and lack of means. The only way to overcome this difficulty is by creating a cooperative society center in which all the people of the village will be members. The society will offer to its members all agricultural equipment and will lend them farming machinery with very low costs and will take care of selling their products. Sometimes it will give them loans for long terms with fair terms, moreover it will give them every possible help in the medical and educational fields.

This cooperative society owns a piece of land far from the center of the village at the North West corner having an area of 1800 Sq.m. which will be used for building special places for keeping milk and dairy production and for sheds for cars and all farming machines. The following agricultural machinery and implements will be needed by

the cooperative center for farming 5000 donums:

- D-6 Caterpillar
- 3-14" Plow
- 8' Disk Harrow Plow
- 8' Seed Drill
- 8' Combined Harvester
- 25 ~~10~~ hp Tractor ✓
- Cultivator
- Furrower
- Grader
- Trailer

X 3, since
owned by as
many people
as you like

PART II

ARCHITECTURAL DESIGN

AND DETAILS

INTRODUCTION:

In the previous discussion, the problem was treated from the point of view of planning; because the thesis is a combination of both town planning and architectural design. Some of the architectural details will be dealt with along with the materials used in building such village.

The village is purely residential area. Most of the blocks and lots are rectangular in shape having 16 meters frontage while the depth varies from 31-33 meters. The other lots are regular in shape but have different areas. Due to this variation in depths, frontage and areas of lots, 3 different type of houses are chosen for the village. The first two types are in rows and are of the same nature but they differ in size. They are semidetached houses - A one family house having one party wall only in common with an adjacent house, each half of the building is a semidetached house, the whole building is a pair of semidetached houses. While the third type is to be built on lots that have a frontage of more than 16 meters and they are different in size and nature.

The row type of buildings is mainly chosen because of its economy on walls, openings and foundations. The problem of economy in such a project is of prime importance but not to the point where other important factors are sacrificed for economy.

BUILDING MATERIALS:

In the Beqa'a district, most of the known building materials

such as cement, steel, masonry etc. are expensive if they are used in the construction of buildings. Due to this and due to the poor financial situation in which the refugees are found, local buildings materials which are cheap and easy to get and manufacture will be used in constructing their houses. Such local building materials are mostly mud with ^{adobe} straws for walls that are not facing west. Wood and mud for roof and cement for foundation. Steel, cement and masonry will be used in building public plans such as schools, health center, worship place and the administration center. Windows and doors are all made of Swaid wood which resist sun and humidity. The sizes of these openings are standardized as much as possible in order to reduce the cost due to mass production which is cheaper than unit production. Fine wire mesh with glass will be used to prevent insects from getting in.

*Why should you love them
Kill them*

ARCHITECTURAL DETAILS

HOUSES

TYPE (A)

DESCRIPTION

They are semidetached houses, in which one family house having one party wall only in common with an adjacent house, each half of the building is a semidetached house. Each house is built on a rectangular lot with a frontage of 16 meters and depth of 31 meters. 13 meters frontage are used by each house and the 3 meters left are used as road way to the garden and barn. This type A as well as B is built in rows and it has an L shape. The area of the building with the barn is about 33% of the total area of the lot.

The frontage of the building goes inside the lot away from the street by 4.80 meters. A terrace 150x5.20 Sq.m. in front of the main entrance is built bounded by a wall 15 cms. thick and 75 cms. high. The floor level of the terrace is the same as the floor level of the building but it is higher than the ground by two steps 34 cms. high. The house contains a vestibule, 2 bed room, kitchen, water closet and bath. The bath and water closet are placed between the vestibule and the kitchen. Between the service center and the bedrooms there is a covered place. The height of the service center with the covered place is less than the height of the bedroom and vestibule. All other informations required including heights, elevation, distances are obtained from the drawings.

GENERAL DETAILS :

(1) FOUNDATION :

on what basis?
found water soil type?

The kind of foundation used for this type is continuous foundation of plum concrete in which the ratio of mixture is 1:3:6. One cubic meter of plum concrete contains 30% of rubble masonry. The foundation is 1 meter below the lowest level of the ground, and has a width of 75 cms, and 50 cms. high. A continuous wall of rubble masonry, 30cms thick is built over the foundation to a height of 30 cms. above the highest level of the land(the land is mostly level). A layer of bitumen is applied over the wall as damp proofing course.

(2) WALLING :

All the walls of the building are built of blocks 25 cms. thick made out of clay and straw, except the western wall is built of rubble masonry, because it is the only wall that faces rain in winter. Blocks should be used when they are dry. Straw is used to reinforce the blocks and it is better to increase the quantity of straw than to decrease it. There are two kinds of blocks, one has a dimension of 25x25x12 and the other 25x12.5x12. The weight of the block varies from 100-200 grams. Each 1000 blocks needs 100-200 kgs. of straw. And cubic meter of earth needs 13-26 kgs. of straw to make 132 blocks. In one day 3 labors can build from 800-1000 blocks or from 25-30 Sq.m. of walls 25 cms. thick. 3 labors are needed for this kind of construction one for building the wall, one to give blocks and clay and the third to mix and make clay. The mixture used to fill the joints between the blocks is mud which is a mixture of earth and water.

(3) PLASTERING :

Internal plaster of mud with straw is to be applied in one coat with a minimum thickness of 2 cms. A white wash is to be applied after that in two coats. *not possible*

Exterior plaster of mud with straw is to be applied in one coat with a minimum thickness of 2 cms. *on rubble masonry also*

(4) FLOORING :

A blockage 20 cms. thick of broken stones or quarry waste is used as a first layer to the floor. A second layer of plain concrete 10 cms. thick is applied over the blockage. This layer is made 10 cms. thick because some of the concrete goes down through the empty spaces between stones about 2-3 cms. No tiles are used because it is expensive.

*What treatment to be concrete?
will you give*

(5) ROOFING :

Materials used in roofing are wood, rush matting, earth and mud. Dry rafts 6 in diameter each are used along the long direction of each unit. Dry rafts 2 in. diameter each are used in the transverse direction of each unit 50 cms. center to center. Above these a rush matting or plates of old tins are used for lying upon. Then a layer of mud is used over it which should be rolled and after that layer of earth is laid upon, having an inclined surface to give a uniform slope toward the garden. Above that a second layer of mud with a thickness more than the first layer of mud. This roof should be rolled immediately after a raining period. The total thickness of these layers varies from 30-45 cms.

(6) WINDOWS AND DOORS :

Windows and doors are made of hard timber (Sewaid) which resists humidity and sun. There are 6 windows of the same size, each 1.35x1.10m., 2 doors 0.85x2.00 each, 3 doors 0.75x2.00 each, and 2 doors 1.00x2.00 each. Reinforced concrete lintels are used for both doors and windows. The length of a lintel is longer than the length of a window or door by 10 cms., and its ^{depth} widths varies from 12.50-30 cms., while the thickness is 15 cms. Lintels which are above windows are projected outside 5 cms. Plain concrete sills are used for windows. The length of each is larger than the length of each window by 10 cms., and its thickness is 15 cms.; while its width is 30 cms. each sill is projected outside 5 cms. with a thickness of 10 cms.

TYPE (B)

DESCRIPTION :

They are semidetached houses in which one family having one party wall only in common with an adjacent house, each house is built on a rectangular lot with a frontage of 16 meters and depth of 38 meters. 12.45 meters frontage are used by each house and the 3.55 meters left are used as roadway to the garden. The building area is 32% of the total area of the lot. This type also as type A is built in rows and has no standard shape. The frontage of the building goes inside the lot away from the street by 5.00 meters. A terrace 1x3.00 Sq.m. in front of the main entrance is built higher than the ground level by two steps. The house contains two major units with a corridor between, The sleeping quarter and the service quarter. The sleeping quarter contains 3 bedrooms, while the service quarter contains a room

which may be used either as a dining room or salon, kitchen, water closet and a bath. The last two minor units are between the kitchen and the bedrooms.

GENERAL DETAILS :

They are similar to the details of type A.

B A R N S

Introduction

Barns are the structures used chiefly for sheltering and handling of livestock, and storage facilities for feed and other items needed for those animals. They are classified into two groups according to their major use.

- 1) General.
- 2) Special.

The barn that I am designing is of the general type in which all of the barn requirements of the farm are met by one principal structure. Cows, feed and vehicle are to be accommodated within one barn.

Description:

Four barns are built as one unit in which one family barn having two walls in common with adjacent barn. The area of each barn is 70.0 Sq.M. at the back of each lot. Each barn is divided into two major units; one for storage and the other for feed and stalls. The storage unit is 3.25x7.00 meters, while the stalling unit is 4.90x7.90 meters. What determines the length of the latter is the number and kind of animals, feed room and service passages for handling the work. While the width is determined by the feeding alley, length of stall and manger and the outside service alley.

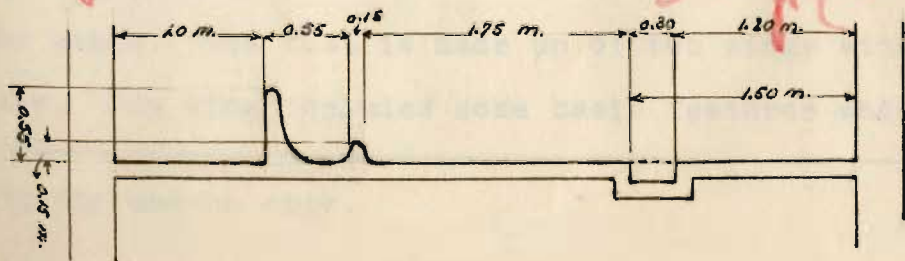
The stalling unit includes 3 stalls 1.25x2.45 m. each with a feeding alley 1.00 m. wide in front and a main service alley 1.50 m. wide at the rear; and two service alleys at the sides. The manger is

70 cms. wide and the feeder is 2.00x3.75 meters. The floor of the stalls slopes gently toward the manure gutter, where the latter is included within the main service alley.

Local building materials will be used in the construction of barns. Foundation are of plum concrete the dimensions of which are the same as the dimensions used in designing house type A. The floor is made out of two layers, one of hard core 20 cms. thick and the other of plain concrete 10 cms. thick. A section through the stall floor is shown below. Exterior walls are to be built of blocks 25 cms. thick each while interior walls are to be built of blocks 15 cms. thick. Materials used in roofing are wood, rush matting, earth and mud. Dry rafts are arranged on the roof according to their length and size.

Each barn has two main outside doors, one for the storing unit and the other for the stalling unit. The first door is 3.00 m. wide and 2.50 m. high and it is opened at the upper part. The second is 1.50 m. wide and 2.10 m. high. it also contains two windows, one 1.00x0.90 for the feed room and the other 3.00x0.90 for the stalls room. The two windows are 1.20 m. above the floor level. Sills and lintels of plain and reinforced concrete, are used for windows and doors but they are not projected outside walls. The net height of the barn is 3.25 meters. Ventilation is secured through windows and door.

Drainage, water, collecting manure

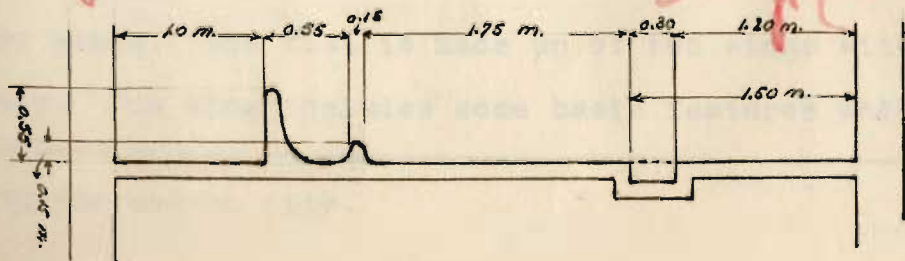


70 cms. wide and the feeder is 2.00x3.75 meters. The floor of the stalls slopes gently toward the manure gutter, where the latter is included within the main service alley.

Local building materials will be used in the construction of barns. Foundation are of plum concrete the dimensions of which are the same as the dimensions used in designing house type A. The floor is made out of two layers, one of hard core 20 cms. Thick and the other of plain concrete 10 cms. thick. A section through the stall floor is shown below. Exterior walls are to be built of blocks 25 cms. thick each while interior walls are to be built of blocks 15 cms. thick. Materials used in roofing are wood, rush matting, earth and mud. Dry rafts are arranged on the roof according to their length and size.

Each barn has two main outside doors, one for the storing unit and the other for the stalling unit. The first door is 3.00 m. wide and 2.50 m. high and it is opened at the upper part. The second is 1.50 m. wide and 2.10 m. high. it also contains two windows, one 1.00x0.90 for the feed room and the other 3.00x0.90 for the stalls room. The two windows are 1.20 m. above the floor level. Sills and lintels of plain and reinforced concrete, are used for windows and doors but they are not projected outside walls. The net height of the barn is 3.25 meters. Ventilation is secured through windows and door.

Drainage, water, collecting manure



S C H O O L

" School location is an important part of the city plan; and must be related to the street system, the park, playground system and the neighbourhood plan." (1)

It is located in such a way that children will not walk more than 10 - 15 minutes to reach their schools.

The school is a combined elementary - secondary, but in two different buildings. It lies in a block which has an area of 19.5 donums, and the distance between it and the furthest point in the village does not exceed 600 meters. The school site is sufficiently large to accommodate playgrounds facilities. The block has other than the school buildings two basket ball fields, football field and a small farm in which the students of upper classes will work and learn the modern methods of agriculture.

The elementary school has a U - shape with an area of 1000 Sq.m. while the secondary school has more or less a rectangular shape with an area of 640 Sq.m. Both are to be built of the usual building materials; footings are of reinforced concrete, exterior walls of cement-stone masonry 30 cms. thick, interior walls of concrete blocks, slabs of reinforced concrete and tiles are used for the floors.

The elementary school is made of one flat so to speak and a basement for games. The flat is made up of two wings with an auditorium between. One wing includes some basic features which should

(1) Planning the modern city.

be included under any circumstances such as the administration center which includes the director's room, class-rooms and water closets for girls. While the other wing includes the teacher's room, class-rooms and water closets with uriners for boys. Other features of the flat are shown in the plan. Class-rooms are 45.5 Sq.m. each and are located on both sides of 2.50 meters corridor. The space provided for each student in the class-room is 1.50 Sq.m. so each class-room will accommodate 30 students. The height of the flat is 4.00 meters taking the floor level of the school as a datum. The auditorium between the two wings is 136 Sq.m. and its height is 6.70 meters. The stage is one meter higher than the floor of the auditorium and behind the stage is the actor's room. The auditorium is used sometimes by the public.

The secondary school is made up of 3 flats. The first flat contains the administration which is made of the principal's room, secretary, waiting room, teacher's room and a private toilet room. It also contains class-rooms and water closets with uriners. The second flat contains two laboratories one for physics and the other for chemistry. In addition to that spaces are provided for storing books, library and a small auditorium or lecture room. The third flat contain class-rooms and observation tower with store. Class-rooms vary in dimensions, and are located on both sides of 2.50 meters corridor and are lighted properly as they are designed to accommodate 170 students. The height of each flat is 4.03 meters which is the height of two flights of stairs each 12 steps.

A clock tower is built right over the entrance room. It is 4.00x9.80 Sq.m. and its height is 14.60m. It is built for two main purposes, to serve the village being the only public clock, and to break the monotony of the building around and have a contract of direction.

be included under any circumstances such as the administration center which includes the director's room, class-rooms and water closets for girls. While the other wing includes the teacher's room, class-rooms and water closets with uriners for boys. Other features of the flat are shown in the plan. Class-rooms are 45.5 Sq.m. each and are located on both sides of 2.50 meters corridor. The space provided for each student in the class-room is 1.50 Sq.m. so each class-room will accommodate 30 students. The height of the flat is 4.00 meters taking the floor level of the school as a datum. The auditorium between the two wings is 136 Sq.m. and its height is 6.70 meters. The stage is one meter higher than the floor of the auditorium and behind the stage is the actor's room. The auditorium is used sometimes by the public.

The secondary school is made up of 3 flats. The first flat contains the administration which is made of the principal's room, secretary, waiting room, teacher's room and a private toilet room. It also contains class-rooms and water closets with uriners. The second flat contains two laboratories one for physics and the other for chemistry. In addition to that spaces are provided for storing books, library and a small auditorium or lecture room. The third flat contains class-rooms and observation tower with store. Class-rooms vary in dimensions, and are located on both sides of 2.50 meters corridor and are lighted properly as they are designed to accommodate 170 students. The height of each flat is 4.08 meters which is the height of two flights of stairs each 12 steps.

A clock tower is built right over the entrance room. It is 4.00x9.80 Sq.m. and its height is 14.60m. It is built for two main purposes, to serve the village being the only public clock, and to break the monotony of the building around and have a contract of direction.

HEALTH CENTER

INTRODUCTION :

The basic functions of a health center are control of communicable disease, public health nursing, individual health protection sanitation control, health education and public health administrations. Within this may be included such services as maternal and child health care, communicable disease immunization, public health education and inspectional services for milk, food and water, among others. In this community the health center is erected as separate building within the civic center facing the public park and it is properly so because only in such a structure can sufficient space be provided to accommodate all of those things which are requisite to a good health department.

DESCRIPTION :

In designing this health center architecturally four points are taken into consideration

- 1) Types of services provided are limited.
- 2) Number of persons to be employed is limited.
- 3) Type of patients to be served.
- 4) Anticipated future need or potential growth of services.

Some of the basic features that should be included in the plan are two waiting rooms with their water closets an information desk.

A nice feature of the plan is :

- (1) the unit of X-rays space, examination room and clinic room with connecting doors, a device which also helps to avoid confusion in the corridor in busy hours and (2) the other examination room and clinic

room with connecting door, located on the other side of the corridor.

Each clinic can serve many services such as maternal, child hygiene and venereal disease control depending upon the rotary schedule for the clinics. Ideally each of these should have space of its own, but they can be combined to conserve space. Separate quarters are provided for sanitarians and public health nurses. Provision is made also for a water and milk laboratory and a medical laboratory. A demonstration conference and lecture room area is provided for health education. Spaces for storage and janitor are provided also. One can easily see that in the plan the office activities are grouped at one end with a separate entrance. And the assembly or demonstration has an isolated location with front entrance so that lecture groups need not get mixed up in maternity or other visitors. And the service quarter also has a separate main entrance.

The health center building is made up of one flat. It has an L shape and has an area of 361 Sq.M. It is to be built of the usual building materials. Foundations are of plum concrete & continuous. Exterior walls of cut-stone masonry 30 cms. thick. Interior walls of concrete blocks, slabs of reinforced concrete and tiles are used for floors.

On what basis do you want all this expenditure

STATISTICS RELATING TO HOUSE BUILDING

% Area utilized in

Type A	Type B	School	Health center
33	32	8.6	40.8

% Area utilized in

Parks	Public places	Streets	Buildings
5.38	11.8	21.8	66.4

B I B L I O G R A P H Y

BOOKS

1. Gibb, Alexander and Partners; The Economic Development of Lebanon 1948.
 2. Carter, Foster; Farm Buildings.
 3. Karl B. Lohman; Principles of town planning.
 4. Cewis; Planning the New City Vol. 1,2.
 5. Architectural Record; October, 1951.
 6. The Encyclopedia Americana.
 7. Nolen; City Planning.
-