

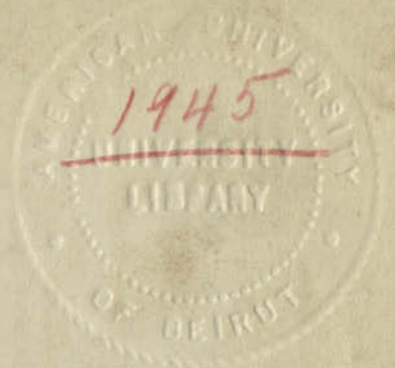
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N. MAKHOUL
BINDERY

27 APR 1968

HARISSA TEL. 72

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T H E
DESIGN OF A SURGICAL HOSPITAL
AND
MATERNITY
at
A' K K A

By
NASUH H. SADI B.S.C.E.
B.A., B.S.

INTRODUCTION

When I intended to complete my engineering studies, and finally decided upon architecture, I was asked by a friend of mine who graduated few years ago from the school of medicine of the American University of Beirut, to design for him a hospital that will satisfy the needs of our town AKKA . He explained his demands fully, and we had to consider the problem both from the economical and local points of view. The first step I had to make, was to visit the place on which the hospital was intended to be constructed, where I examined the feasibility of the execution.

Finding out that all the conditions are suitable, and fit for such a project, and in order to be acquainted with its requirements I find it my opportunity to study the case properly, and to choose for my thesis :

" The Design of Such Hospital "

It is of much interest to me to state that this project which is hereby described both in writings and by the attached plans & drawings, is for a structure which will be actually erected soon after the war is put to an end, and certainly after the approval of whoever is concerned.

NAME OF THE PROJECT .-

This project will be called :

- " THE HOSPITAL OF AKKA " -

which will be designed for Surgical & Maternity services .

.../...

LOCALITY :-

The hospital will be built in the " District of Akka " in Palestine, about three kilometres to the north of the town. It lies in the property of my friend in an orange grove which is about twenty two donnms (21,800 sq.m) located along Haifa - Beirut road . The orchard is planted with orange trees, which are irrigated from a semi-artesian well drilled there ten years ago .

The town is the centre of AKKA district, including fifty villages, and it is much condensed with population but in spite of this, it has not any hospital, and nothing has been intended to fill this gap.

REQUIREMENTS :-

According to the demands of the owner, the mentioned hospital must be large enough to take care of thirty to forty patients at a time . It should not be more than two story building and a basement if necessary, with the idea of having possibilities for future enlargement. It should also provide accomodation for the resident doctor, nurses and servants .

PRELIMINARY INVESTIGATION .-

There are various local points that should be taken into consideration, and which should be kept in mind while performing the design. These are : -

- I. - TOPOGRAPHY - the hospital will be erected on a piece of land in the middle of the plain of AKKA which is thirty six kilometres long by ten to twenty kilometres wide . This plain extends from Ras-En-Nakoura in the

the north , down to mount Carmel in the south, and from the ridge of the mountains in the east to the Mediterranean Sea Shore in the west. Thus the hospital will be erected on a level ground .

- 2.- Soil.- while drilling the well of the orchard, it was found that the surface layer was ordinary clay about two meters and a half in depth, and that below was a stratum of sand mixed with gravel four metres in thickness below which was found the rock. It is expected that this strata extend to the place on which the building will be erected, and hence it is presumed to lay the foundations on the sand gravel stratum.
- 3.- WIND - Usually wind blows from the south and south west , and during part of winter it blows from the east where it is then called the " Sharquieh". The weather conditions of the locality are quite normal, it is neither hot nor cold
- 4.- EXISTING STRUCTURES .- There are no buildings of importance in the vicinity, except few small dwelling houses occupied by the farmers. They are ordinary buildings constructed without any special architectural feature that might influence my design.
- 5.- Available materials.- Practically all of the new buildings of AKKA are built of hard limestones quarried from the east ridge of the mountains, while most of the old houses of the town where built of sand stones.

Due to the fact that the available sandstones now a day are not of good quality, it is decided to use limestone for the construction, the best quality of which is known in the district as the " JOULSY " after the village of JOULIS .

The main parts of the exterior walls will be made of " hammer dressed block in course masonry", and

the rest will be made of " tooled stones "

Clay bricks are in excess, obtainable from the " Brick factory " which is situated along the side of Haifa Road at a distance of five kilometres south of the place .

Cement will be obtained from " Neshar factory " which is near Haifa, and which produces huge amounts of good cement. The rest of the concrete aggregates are in excess in the neighbourhood of AKKA , whose sand used to be , and still it is transported to the different parts of the country being very clean and suitable for most of the concrete mixes.

The rest of the building materials, such as the tiles, glass, iron works etc... could all be obtained from the factories that are scattered between Haifa & AKKA , while the necessary transportation could easily be done either by the trucks or by the railway.

There still remain the problems of water supply and electricity.

The first will be obtained from the well in the orchard, and the second from the main electric line of the " Palestine Electric Corporation " which passes by the place .

It could be observed from what I have mentioned above that all the necessary materials needed for erecting the hospital are available and can easily be obtained , a fact that renders possibility for the execution, which I hope to perform when time permits .

SPECIFICATIONS AND REGULATIONS .-

While setting out the different dimensions of the hospital I had to refer and conform to the "Municipal and Town planning By-Laws" which are enforceable throughout Palestine, whether in towns, cities, villages or suburb areas. The only special restriction which is just occurring in the locality of the hospital is that arising from the nearby main road, this Haifa - Beirut road is considered part of the "International Highway No. I" which starts at London, crosses Europe to Istanbul, and passes through Palestine to Cairo. It is specified that the above mentioned road should have a "right off way" of forty metres, while the width of the existing road is twenty metres. Hence it is necessary to provide for the future by leaving enough space between the edge of the building and the center line of the present road.

This will be taken care of during the execution of the work, and the reason for drawing back the building line twenty metres only, as shown by the location plan is to indicate the space reserved for the "right off way".

MISCELLANEOUS PROVISIONS .-

I.- Area of Building .- According to the definition given by the Municipal & Town planning By-Law" applied for buildings in Haifa Area, buildings are classified into:-

- * I.- Dwelling house : which means a building used or constructed or adapted to be used as a dwelling by not more than two families, and no part of which is used for trade →

* Reference book " the Municipal and Town Planning By-Laws" Section I - Page 79 of Haifa.

purposes, and the cubical extent of which does not exceed four thousand cubic metres. "

2.- " Domestic Building , which includes :-

- a- a building used or constructed or adapted to be used wholly or principally for human habitation and not being a dwelling house.
- b- a building used or constructed or adapted to be used as an hotel, lodging house, home; refuge, shelter or orphanage, where such building has a cubical extent of less than thirteen thousand cubic metres, and has sleeping accomodation for less than fifty persons, a n d
- c- a building used or constructed or adapted to be used as an office, counting house or shop which has a cubical extent of less than four thousand cubic metres " .

3.- " Public Building ; which includes .

- a - a building used or constructed or adapted to be used as a Hospital , school, college, public library, or public exhibition room .
- b- a building used or constructed to be used as an hotel, restaurant, lodging house, home , refuge, shelter or orphanage where such building has a cubical extent of a thirteen thousand cubic metres or more or has sleeping accomodation for fifty or more persons, and
- c- a building used or constructed or adapted to be used wholly or principally for human habitation of a greater cubical extent than thirteen thousand cubic metres " .-

There are certain regulations for every class of these buildings which are mentioned above, and it is necessary to quote some of the regulations concerning the Public buildings.

-X- " The area of such public building is restricted to twenty five per cent of the total area of the land which should never be less than six hundred square metres! The area of the hospital amounts to seven hundred and fifty Sq.m., while that of the orchard is twenty one thousand and eight hundred Sq.m., which shows that only three and one half per cent of the total area of the land will be used for the building.

II Elevation :- The height of the two floors of the hospital above the level of the ground surface amounts to ten metres and fourty centimetres. This is within the limits of the By-Laws refered to previously which state -XX-"No. part of any building shall be at a greater height above the footway than five fourths of the horizontal distance between the face of such part of such building and the building line on the opposite side of the street to which such building fronts".

III Open space about Buildings :- -X- "There shall be provided in the rear of every building an open space, and such open space shall conform to the following rules:

(a) The aggregate extent of such space shall be not less than twenty five square metres.

(b) Such space shall extend through out the entire width of such building.

(c) The distance across such space shall in no place be less than three metres and twenty five centimetres.

(d) Such space shall belong exclusively to such building."

-X- M. & T.P. By-Laws-District B. Page 164
-XX- " " " " Section 3- Page 84.
-XXX- " " " " Paragraph 6 page 86.

.../...

As shown by the attached location plan, all of these mentioned regulations are provided for; even the open space left at the back of the hospital is more than the built up area.

IV HEIGHT AND VENTILLATION OF ROOMS :-

Every habitable room is made large enough and is well ventilated. The dimensions of windows, and areas of the rooms are ample enough compared with the By-Laws which say (X) "Every habitable room shall cover a floor area of not less than seven square metres, and except in the case of rooms situated wholly or partly in the roof shall not be less than three metres and twenty five centimetres in height"

The height of every story of the hospital is four metres and sixty two centimetres, and the reason why I have chosen this is to provide enough height for the public wards which are quite large compared with the other parts of the building.

The By-Laws add "Every habitable room shall have one or more windows opening directly into the external air with a total area free from any obstruction to the light equal to at least one tenth of the floor area of the room and so constructed that a portion equal to at least one twentieth of such floor area can be opened, and the opening in each case shall extend to at least two metres above the floor level." -

Practically I designed all of the windows to have the dimensions of either one metre by one metre and eighty centimetres, or one metre and sixty centimetres by one metre and eighty centimetres, they all open directly to the external air. The floor area of the smallest habitable room is equal to nine square metres and a half, while the total area of the smallest window is equal to 1.8000 Sq.m. which is about one fifth the floor area of the room.

V STAIR-CASES AND CORRIDORS :-

The By-Laws concerning the dimensions of stair-cases and

(X) - M. & T.P. By-Laws SECTION 4 Page 87.

(XX) " " " SECTION 4 Page 87

corridors are :

(x) " In every building having a floor at a height of two metres or more above the level of the ground, a staircase leading to the level of the ground shall be provided in such a way that a person standing at any point on any floor of such building shall not need to walk more than twenty five metres to gain access to such staircase or Staircases "

In the hospital, there are two staircases leading up to the first floor, the first is the main stair-case placed at the middle of the building which is thirty five metres long, and the second is in the service wing. There is also a lift just near the main staircase provided with a secondary opening into the mortuary located at the back of the building . The By-laws add :

" The vertical distance from any tread or from the floor of any landing, corridor, or passage way to any ceiling or beam above shall be not less than two metres and ten centimetres " which is also taken care of in the case of the exit at the back of the building by making the height of the landing above, two metres and thirty centimetres. The same allowance is provided for the exit of the service wing+.

Article 6 of the above mentioned laws state :
" In a public building, the rise of every stair shall be not greater than sixteen centimetres. The going in centimetres shall be such that when added to twice the rise in centimetres the resultant sum shall be not less than sixty nor more than sixty three " -

The rise of every stair of the main staircase is made sixteen centimetres and a half while the going is equal to thirty centimetres which when added to twice the rise it will sum up sixty three.

" No flight shall be less in width than one metre, and every such flight shall be supported at either end " for the main staircase I made the width of the flight one metre and thirty centimetres.

" Every flight shall be provided with not less than one handrail. Every such staircase shall be adequately ventilated and illuminated by means of windows or skylights opening directly into the external air " - which , as it could be seen on the attached plans, are all satisfied .

It is necessary to mention, with this respect, that the above mentioned laws are not applicable to secondary staircases, which may be designed with different dimensions that might suit their purposes .

VI- THICKNESS OF WALLS :- Exterior walls which are above ground surface are designed to act as bearing walls having a thickness of thirty five centimetres, and those below are made fourty centimetre thick.

I have also made the thickness of the interior walls twenty centimetres , and that of the partitions in the toilets ten centimetres. These dimensions are choosen to comply with those set up by the building laws refered to previously which limits the thickness to thirty three centimetres.

.../...

VII SANITATION AND WATER SUPPLY : -

As mentioned in a preceeding article, there is a semi - artesian well in the orchard. It is provided with a centrifugal pump used to supply the water needed for irrigation purposes . The water of the well is drinkable, and the pump can be used to supply the requirements of the hospital. Thus water can be pumped and stored in water tanks placed at the roof near the service staircase tower. The water pipes to be used of galvanized wrought iron .

As regards sanitation, the building By-Laws state the following :

(x) - "Every public building shall be provided with closet accomodation as may be required by the public health Authority " . This requirement is expressed else where as one closet per ten persons inhabiting the building.

" The floor area of such closet shall be not less than one square metre and twenty square centimetres. It should never be less in width than ninety centimetres. Every such closet entered from within a building shall be provided with an operture or window not less than one quarter of a square metre in area exclusive of any frame and opening directly into an open space not less in area than ten square metres measured horizontally at the level of the floor of such closet.

It should be ventilated by means of not less than one si brick built into the external wall or by an air shaft or by some other effective means additional to the aforementioned window " -

All the preceding provisions are considered and are satisfied in the design of the hospital, where there are plenty of water closets and urinals, and where the windows are more than two square metres each. In addition to this last precaution every closet will have an air shaft to drive off all bad odours.

Soil pipes are to be constructed of heavy cast iron, twelve centimetres in diameter; they will be entirely separate from any rainwater pipe or any waste water pipe; and will be provided with mosquito net covers.

The By-Laws add " Drains shall be constructed of cast iron, glazed earthenware or cement and shall be of a pattern approved by the Public Health Authority provided that cement pipes shall not be used for any drain whose internal diameter is less than twenty centimetres. They must have an internal diameter of not less than ten centimetres, and shall be laid with a proper fall and with socketed or other water tight joints to be approved by the P.H. Authority ". The rest of these regulations may be summarized in the following :

" Every drain must be properly supported ; it must not pass under any building, and it must be provided with a suitable trap at a suitable distance from the building"

I have considered all of these provisions, together with the matter of sewage which will be disposed of into a septic tank provided with flush tank and a siphon.

.../...



VIII SITE S, FOUNDATIONS, AND WATER PROOFING OF WALLS :-

The site on which it is intended to erect the hospital lies at the north east corner of the orchard whose ground surface is level all through out. The foundations are to be laid on the sand-gravel layer which is expected to be found below the surface clay. They will be made concrete footings above which to be built masonry walls forty centimetres thick .

In order to take care of the dampness of the place specially during winter, every wall will be provided with a damp proof course made of ~~a~~ asphalt at a height of twenty five centimetres above the surface of the ground. For the basement, the underground walls will be covered on the outside by a layer of asphalt behind which will be damped sand mixed with gravel.

IX CONSTRUCTION .-

To get a strong sturcture, and in order to ensure its stability, the walls will be tied up, and the floors of the hospital will be carried on reinforced concrete beams, which will be designed later in accordance with the specifications of the Joint Committee.

X CONCLUSION :-

The hospital will be built on the north east corner of the orchard shown in the location plan. The orchard is full of trees, these being valuable, it is intended

.../...

to minimize their destruction while clearing sufficient space for erecting the structure.

Another reason is to eliminate the temptation that this orchard would offer to any visitor frequenting the hospital.

From the above paragraph it can be seen that there is a tendency to make the hospital in question, as compact as possible without sacrificing any of the advantages that may be offered in not having to go too high while trying to obtain the floor space required for the different purposes. Thus it is clear that the foregoing reasons advocate the introduction of a basement where in, a number of the less important functions of the hospital will take place.

It may be of interest to explain in the few words that follow, some of the different parts of the ground floor and the first floor, and why they have been arranged in the manner shown in the plans.

GROUND FLOOR :-

1,- South wing : Note worthy mention should be given to the particular type of clinic included in this part of the plan. This clinic as its situation suggests, is intended to serve patients who do not require hospitalization, but who may come from the nearby villages seeking medical aid. This point is of great importance, since this will be the only hospital in the district of AKKA.

2.- North wing :- A feature of importance is the location of the service quarters present in this wing. Their location is such that they offer the least interference to the regular functioning of the sick rooms. Moreover the said quarters are situated so that the prevailing wind which comes from the south

west and east directions will carry away any odours that may otherwise get into the hospital and create a disagreeable atmosphere.

FIRST FLOOR .-

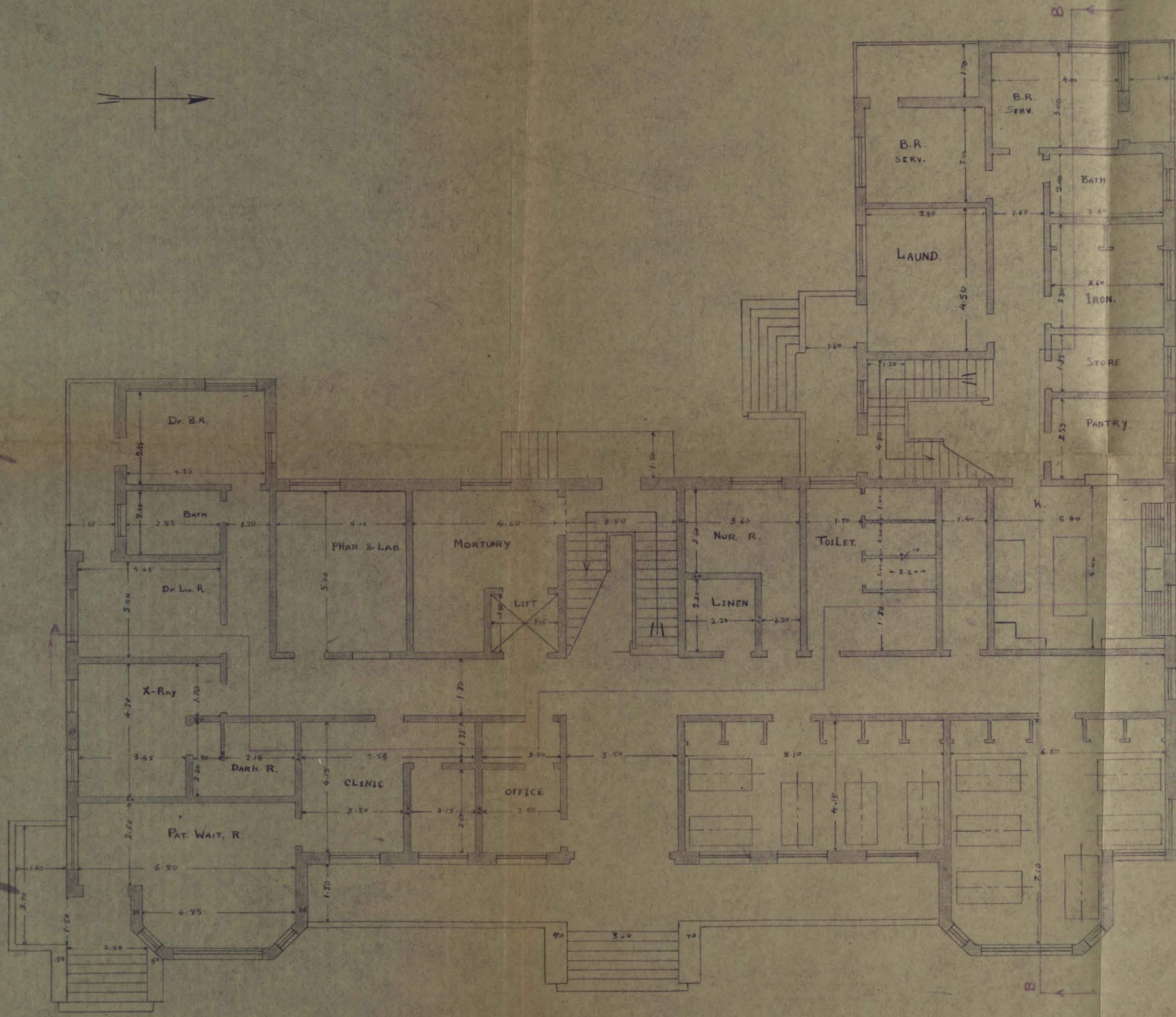
1.- South wing .- This includes the continuation of the surgical part of the hospital, and also the operating theatre. The latter will have year round air - conditioning, thus availing this important room with the most ideal atmosphere, which is essential both to the surgeon and to the patient undergoing the operation.

2.- North wing : This wing has been completely sacrificed for the second function of the hospital - namely the maternity - thus making of it a unit, completely independent of the other parts of the hospital, and in this way achieving a condition of quietness very essential for mothers and their newly borne babies.

In closing, I hope I have given this project due technical study in all its important phases, in spite of the limitations imposed by the different financial and local factors. -

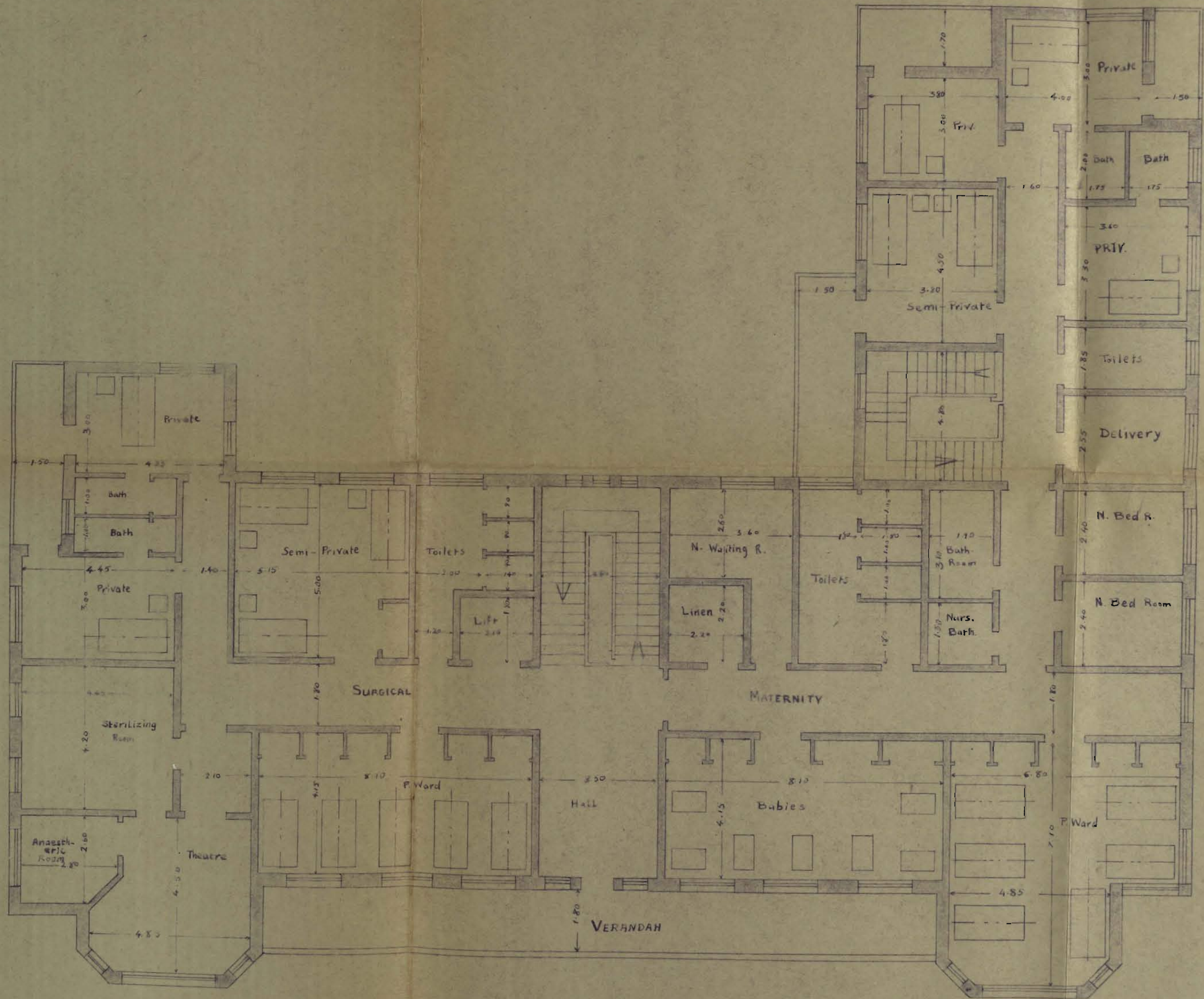
A. U. B.
10th of May 1945

NASUH H. SADI
B.A. ; B.Sc.



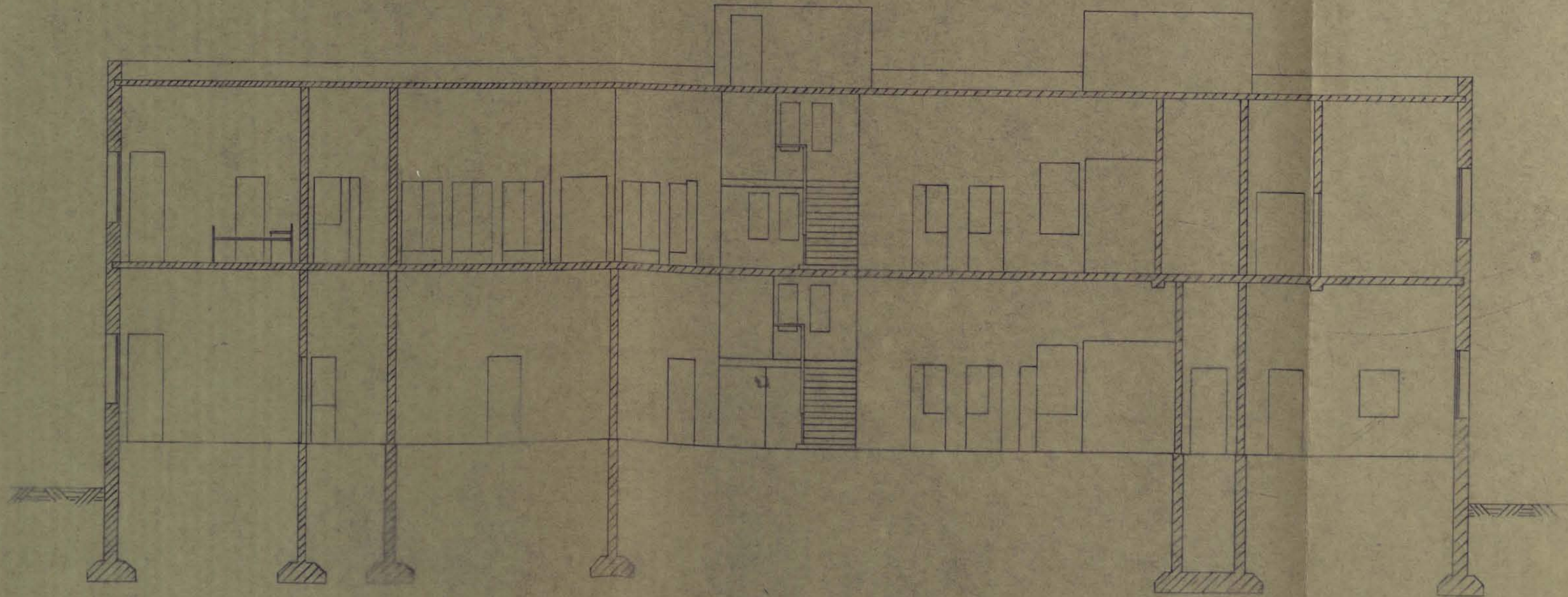
GROUND FLOOR

HOSPITAL OF
A'KKA
SCALE 1/100
Sadi

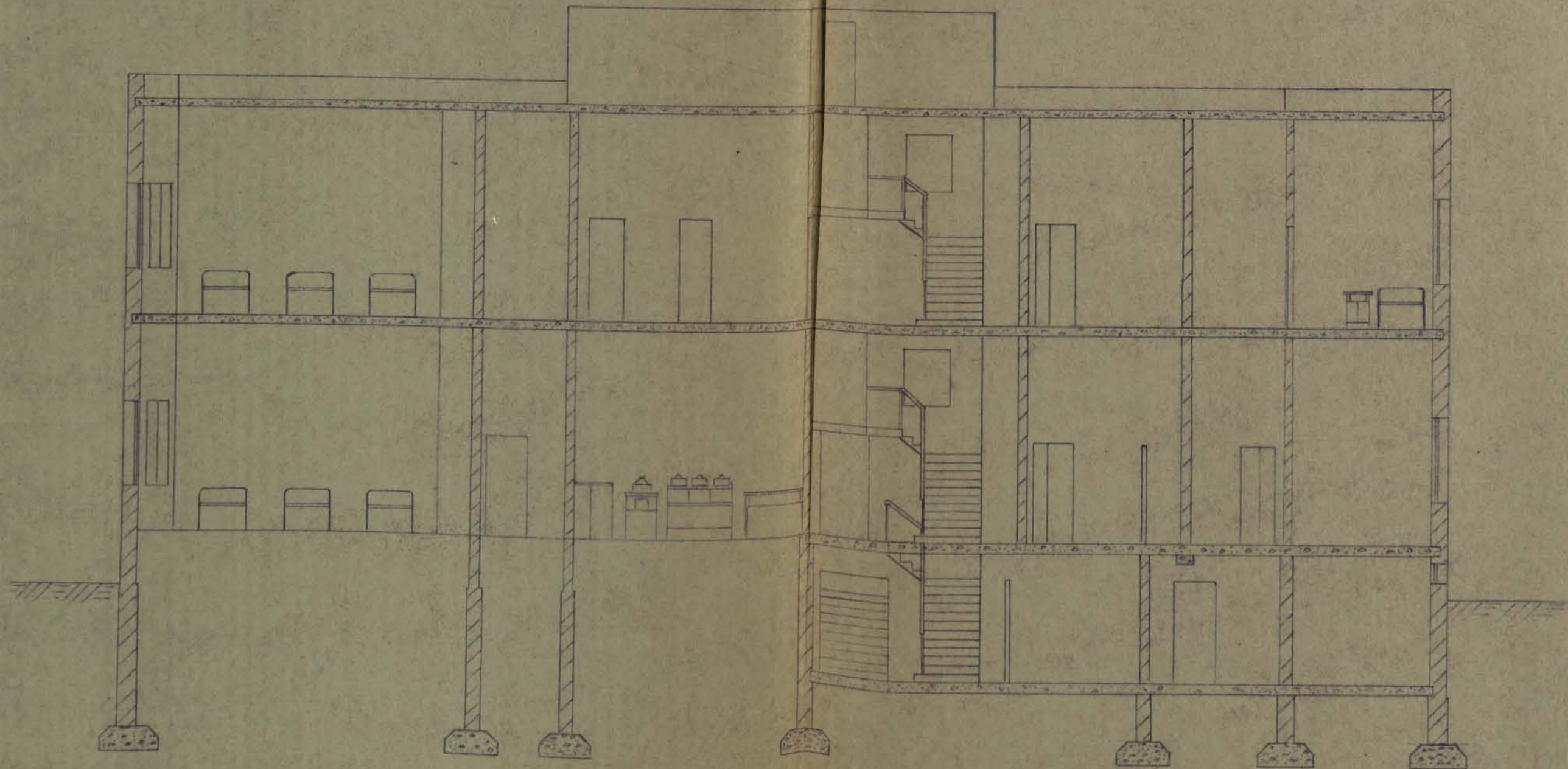


FIRST FLOOR

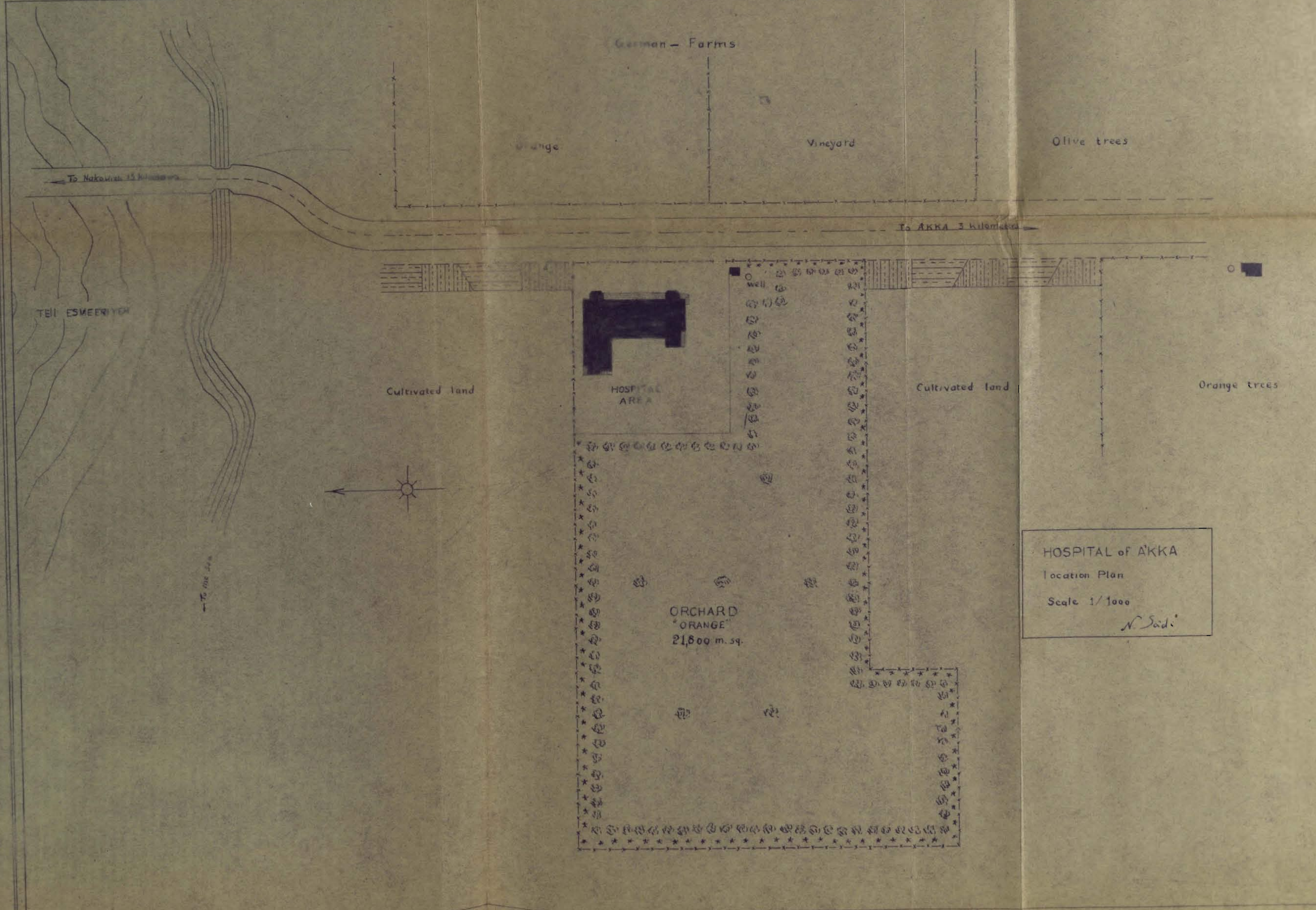
HOSPITAL OF
AKKA
Scale, 1-100
N. Sadi



SECTION A-A



SECTION B-B



German - Farms

Orange

Vineyard

Olive trees

To Nakourah 15 Kilometers

To AKKA 3 Kilometers

TEH ESMEERIYEH

Cultivated land

HOSPITAL AREA

Cultivated land

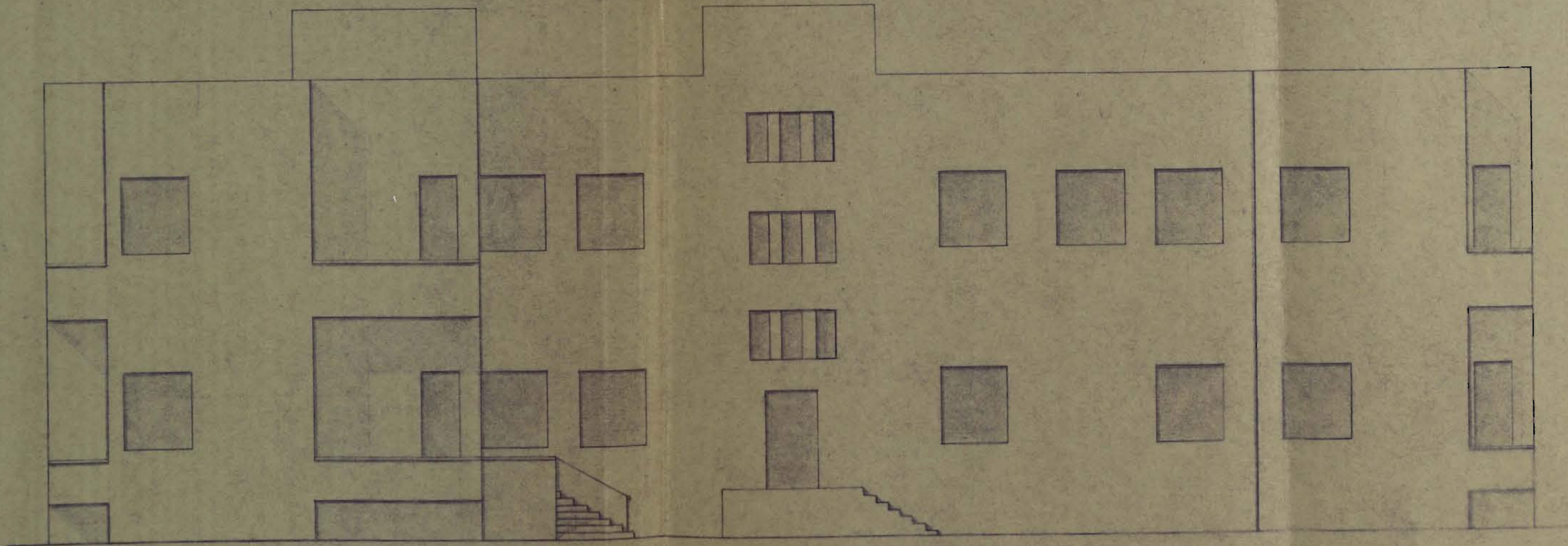
Orange trees



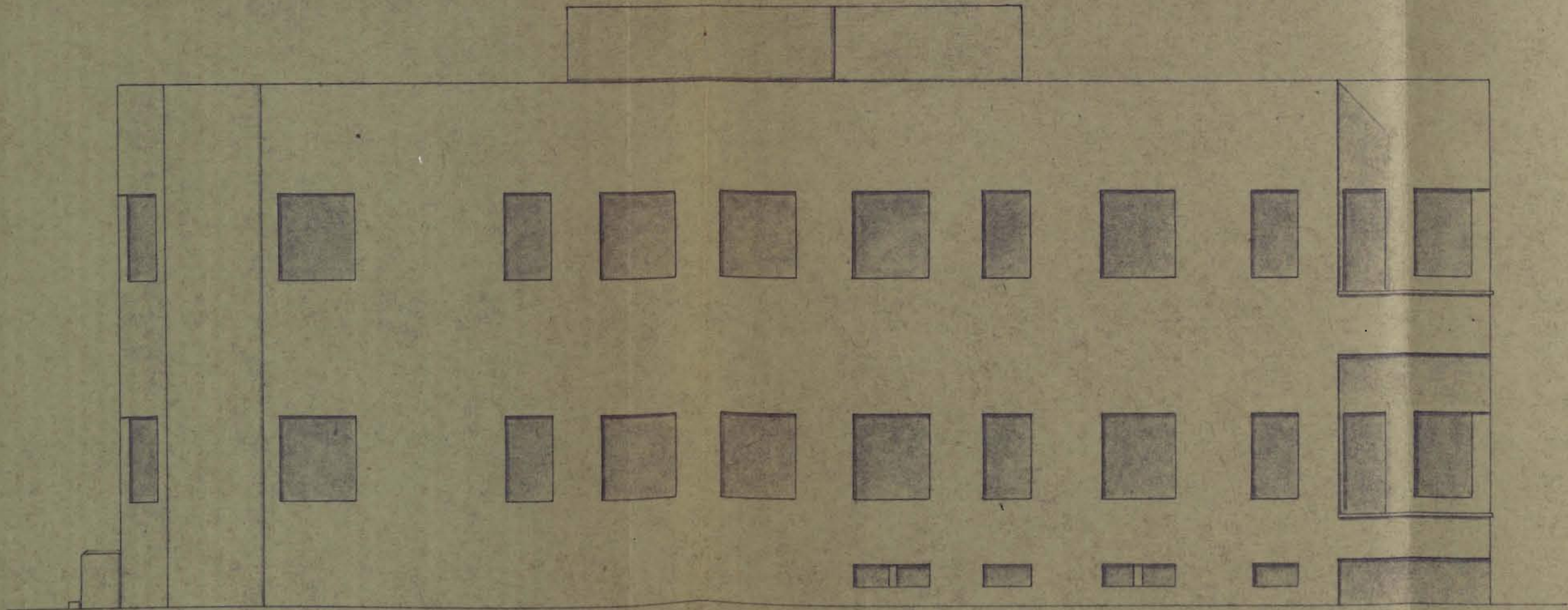
To the Sea

ORCHARD
"ORANGE"
21,800 m. sq.

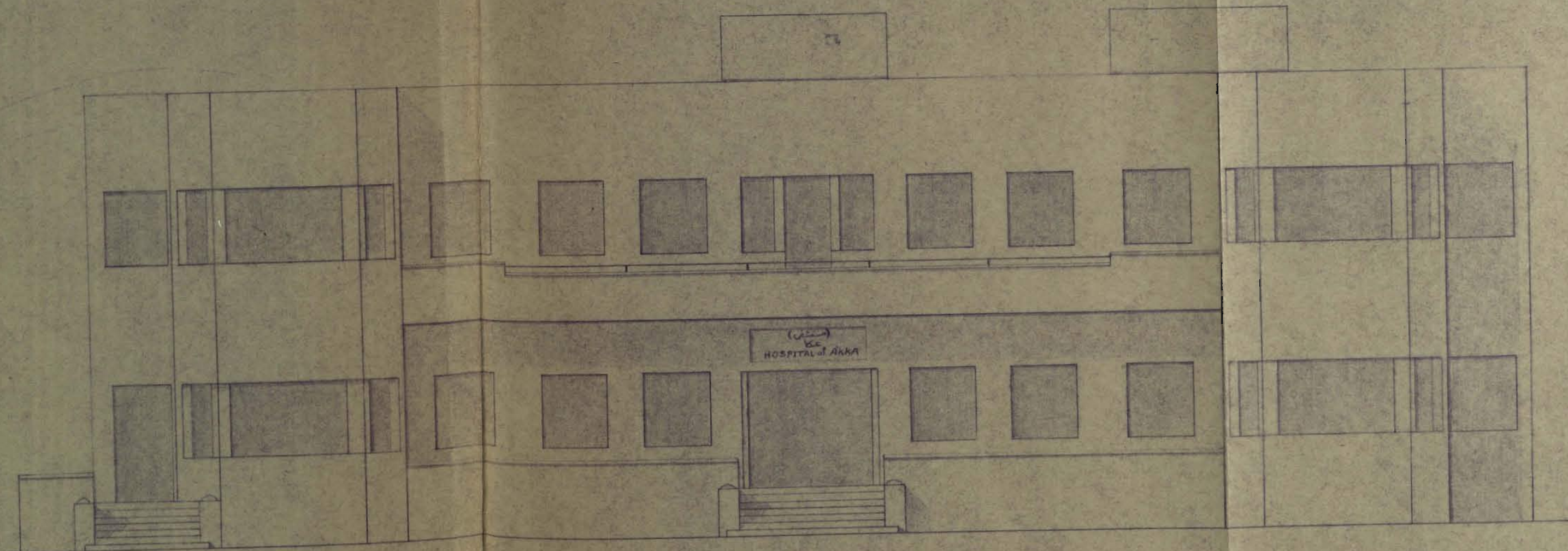
HOSPITAL of AKKA
Location Plan
Scale 1/1000
N. Sadi



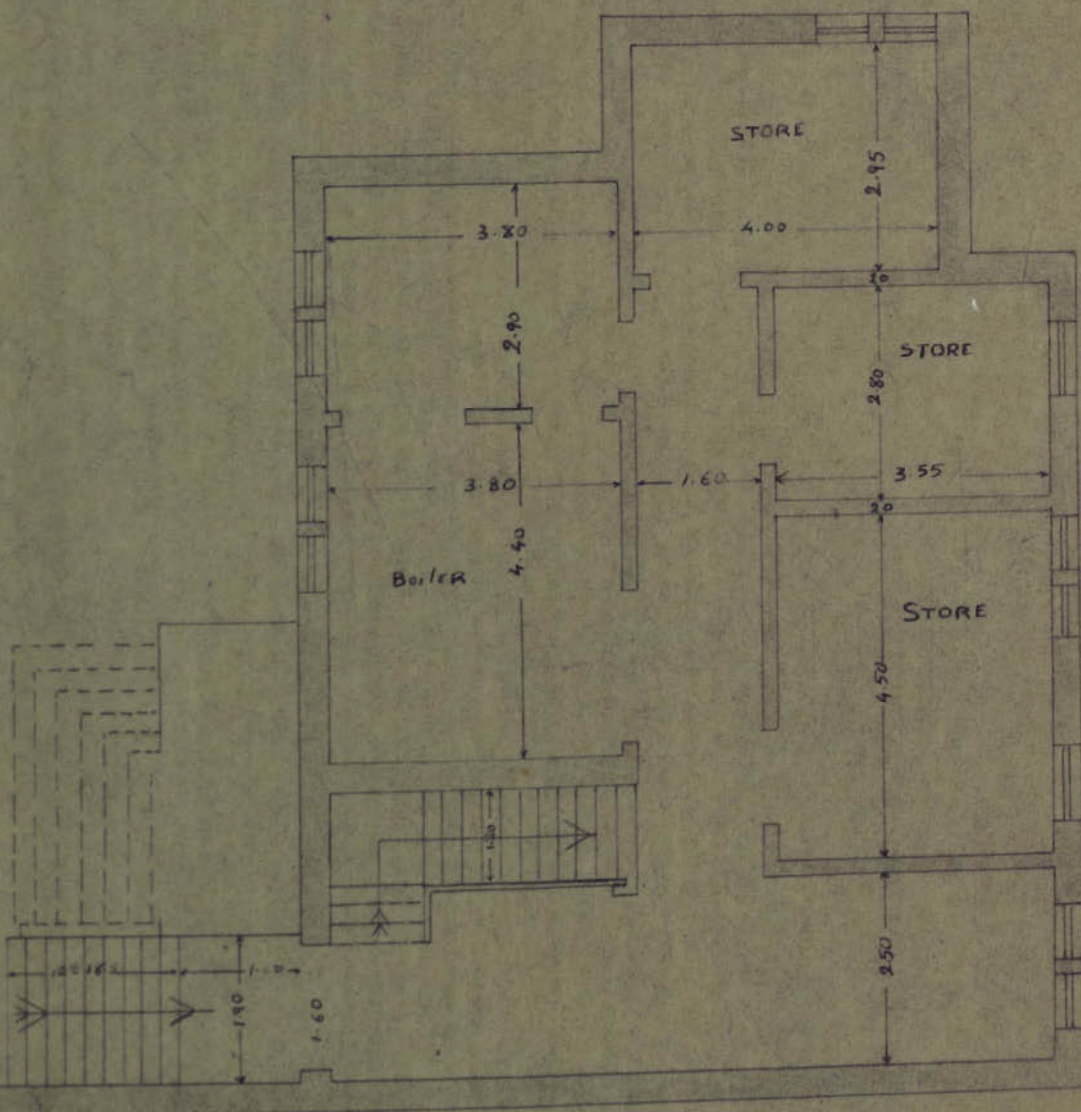
ELEVATION TO WEST



ELEVATION TO NORTH

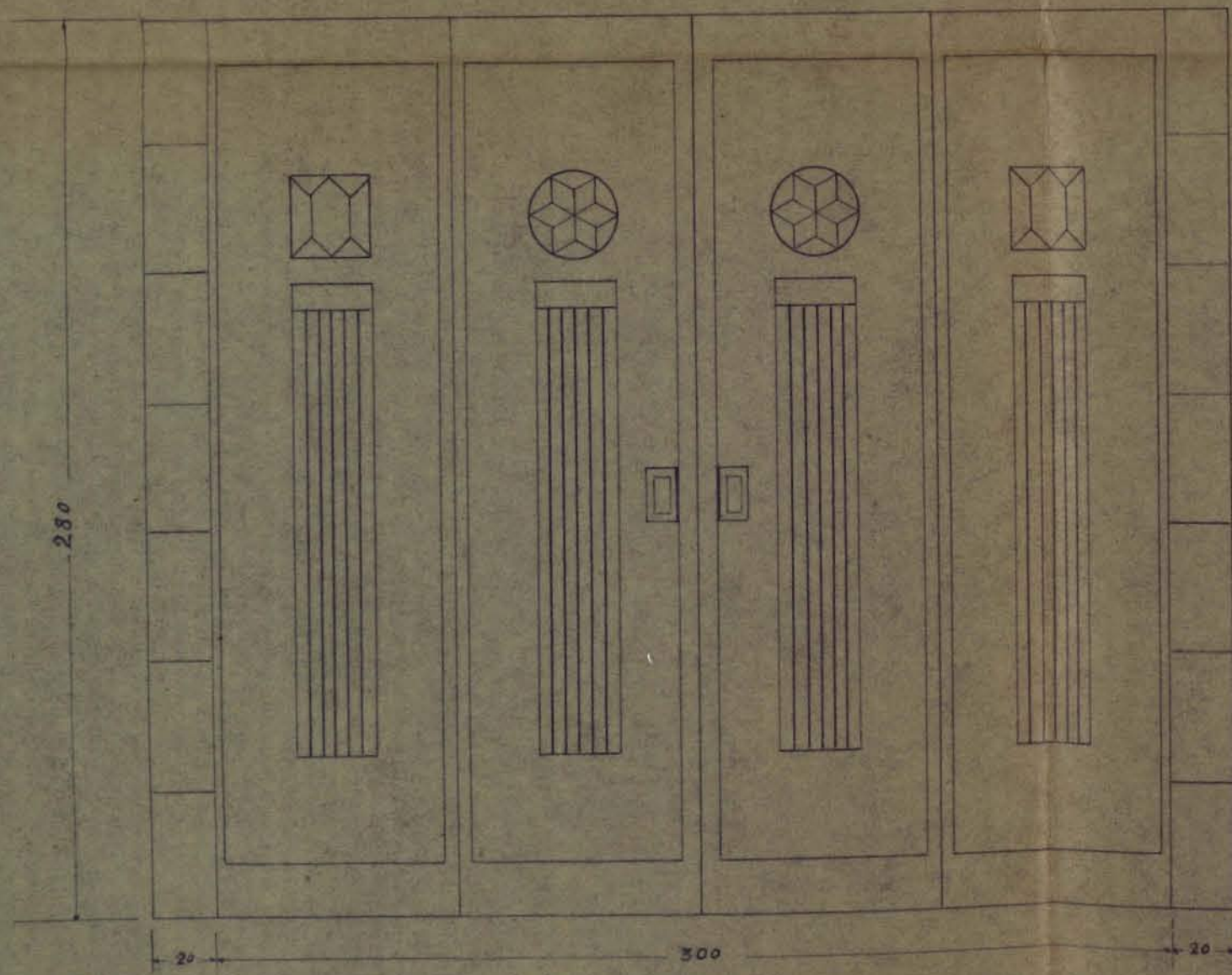


ELEVATION TO EAST



BASEMENT

HOSPITAL
OF
A'KKA
SCALE 1/100
S. S. S.

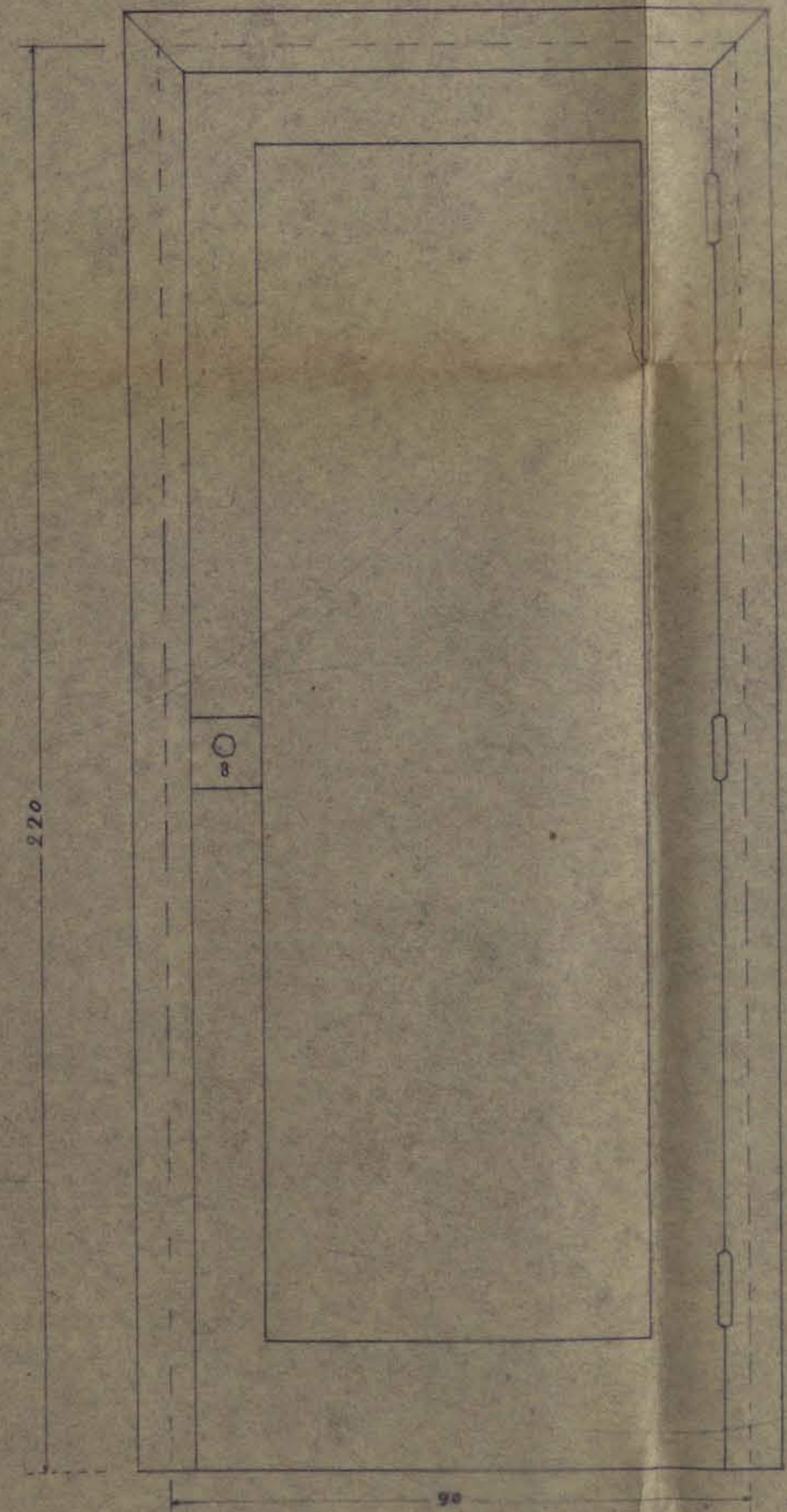


MAIN ENTRANCE - METAL DOOR

End Panels are fixed;
 Covering Plates are of
 Glazing Aluminum Alloy;
 Middle bars are of copper.

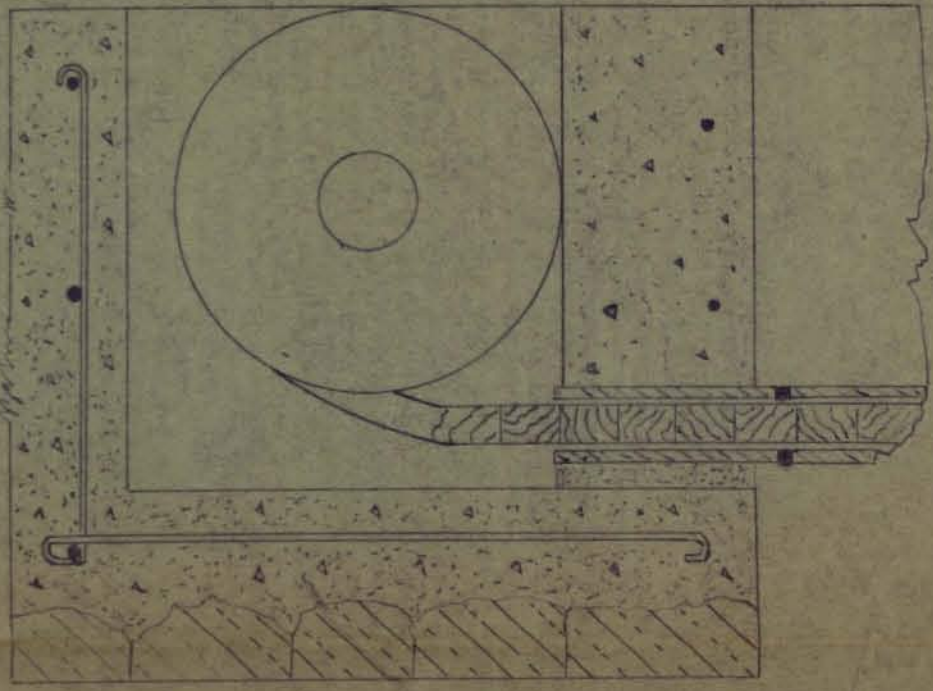
Scale 1-20

M. Sadi



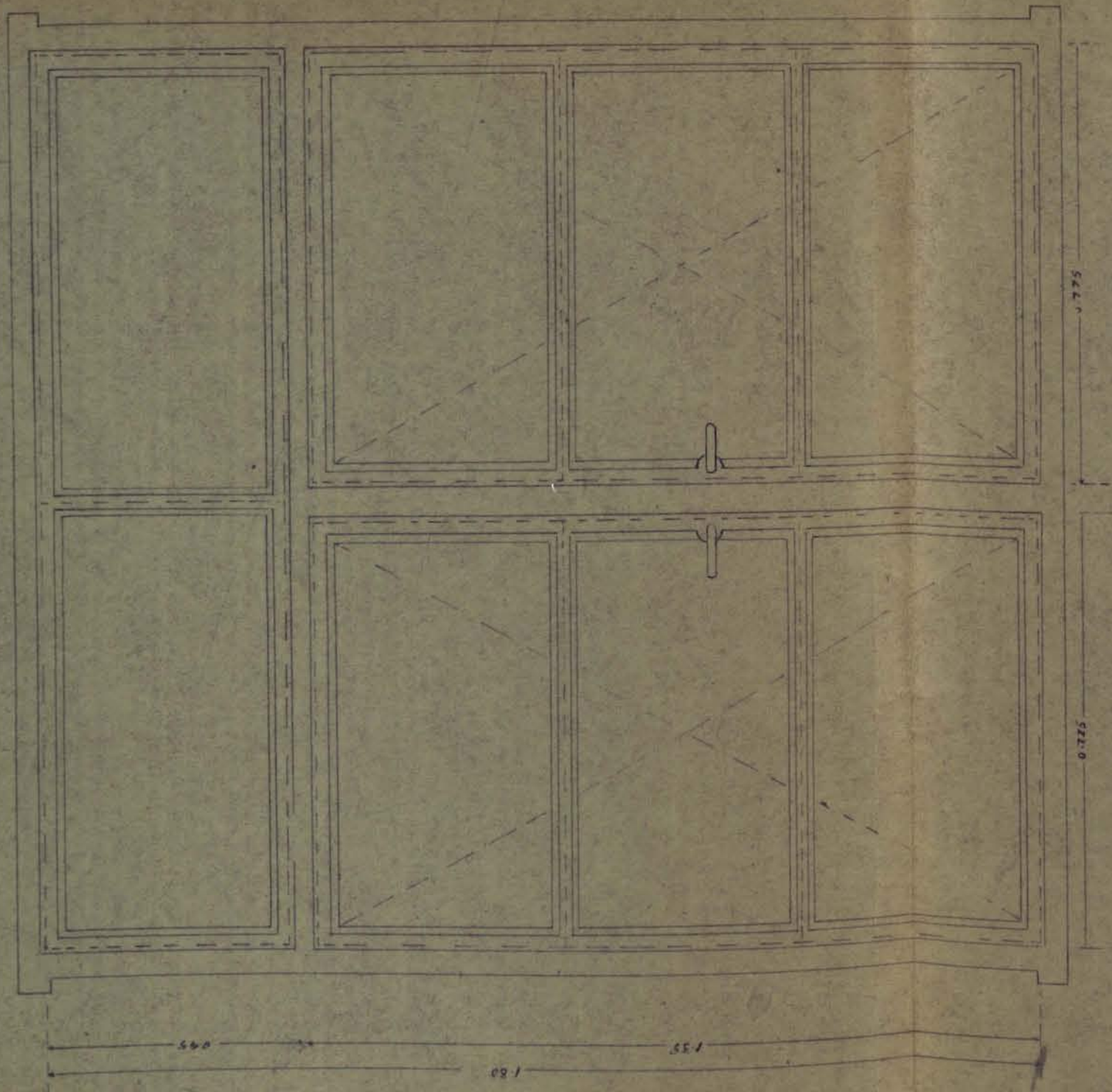
Single Panel Veneered Door

Scale 1-10



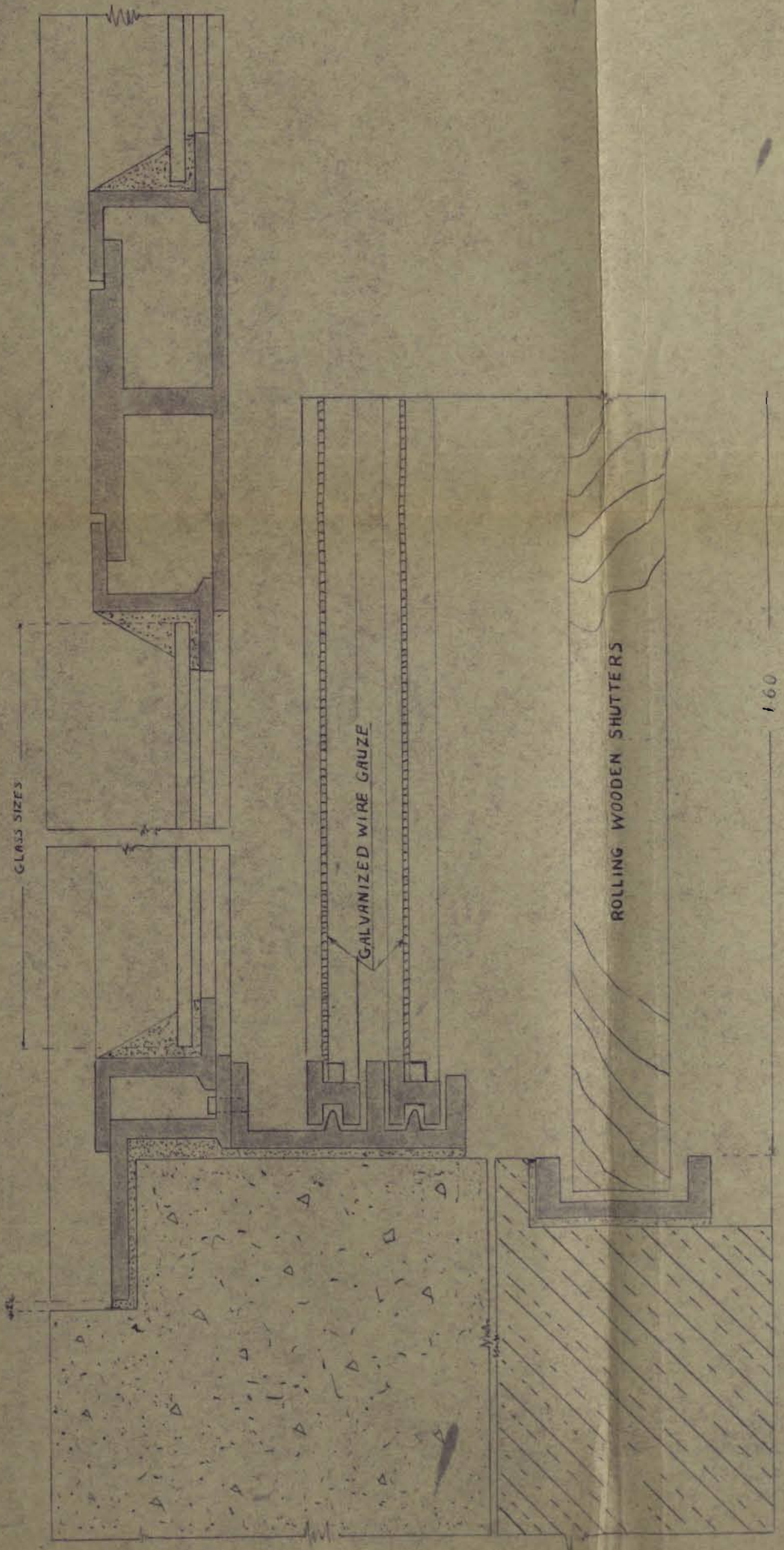
SECTION AT HEAD

Scale 1:4



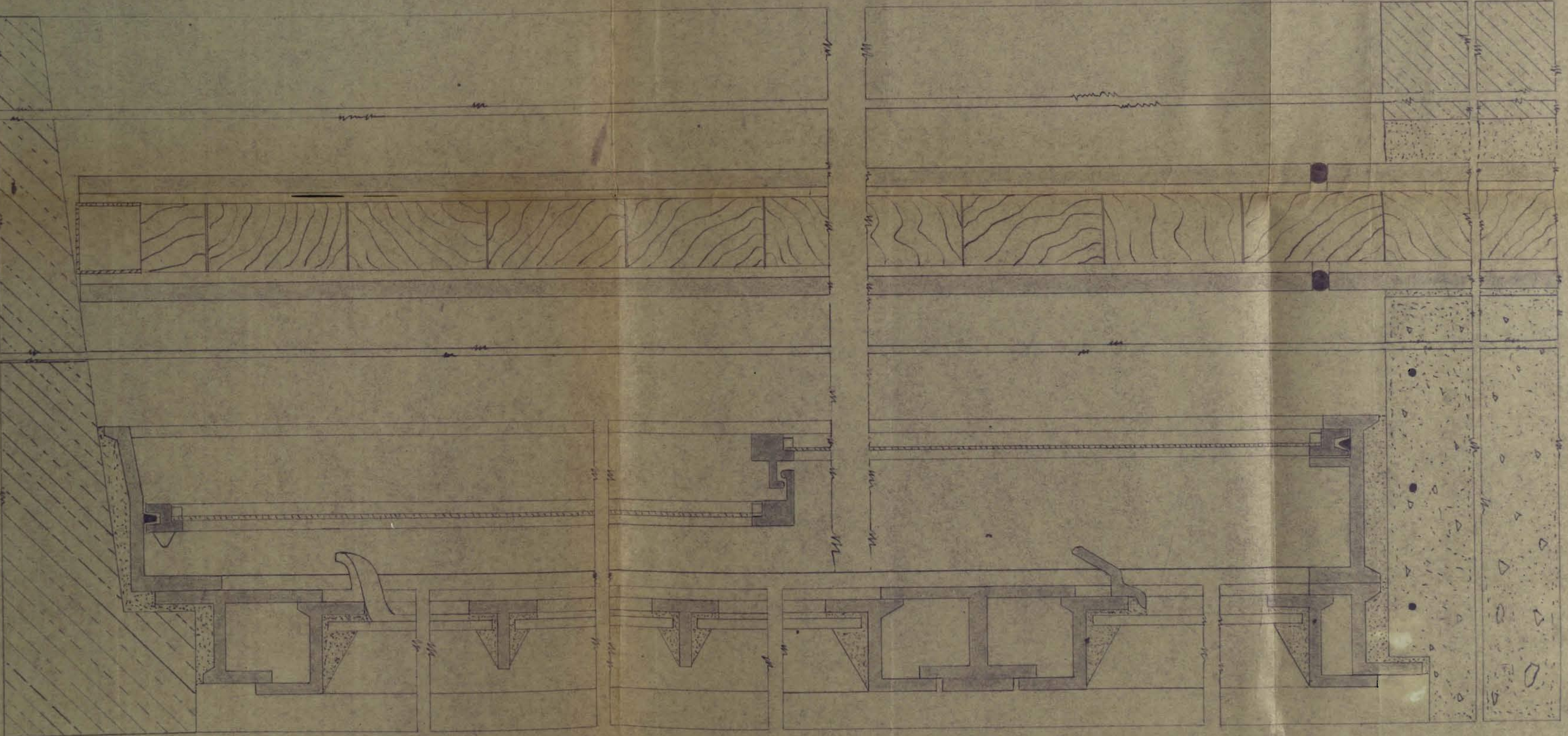
INSIDE ELEVATION OF WINDOW

SCALE 1/10



PLAN - FULL SIZE SCALE

M. S. S. S.



VERTICAL SECTION
FULL SIZE SCALE

W. S. Galt

FUND FEB 26 '68

DEALER

ORDERED

LIST PRICE

RECEIVED

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Sadi,

hospr
Akic

