ARCHITECTURAL DESIGN
OF A
HOT SPRINGS RESORT AT HAMMA, PALESTINE

BY

ANIS S. SURUJI - 1950

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INTRODUCTION

El-Hamma is the name given to a plot of land lying at the northeastern corner of Palestine. The land is rich in mineral waters which were left to find their way into the Jordan river until a company in 1936 secured a concession from the British Mandatory Government to utilize the waters for healing purposes. Although the medical value of mineral waters is still open to discussion, yet the sites of mineral springs are unquestionably excellent winter resorts. El-Hamma is no exception; its mild winters and dry climate make of it a frequented winter resort. Thus in the study of this project it was born in mind all through that the resort should be planned not as a refuge for the sick only but as a comfort and pleasure centre as well for others.

The economic feasibility of such a project is beyond dispute. A glance at the accounts of the company running the place at present suffices to convince a doubter of this fact. The concessionaire started the project in 1936 with a capital of £ 30,000. In 1945 the capital shot up to £ 200,000. The implication is clear.

The Poor accomodations and meagre facilities available at the site at present never deterred the sick and healthy alike to crowd the place every year; so much so that often the authorities had to put up tents to house the extra people.

The advantages of a replanning of the whole resort are thus obvious. A former official of the company explained, " a replanning and introduction of modern facilities will at least quadruple the number of visitors to El-Hamma". A detailed study of the present accomodations and planning in El-Hamma will appear in the first chapter. Suffice it to say now that even rebuilding the whole of El-Hamma will be economically advantageous in the long run.
An extract from an Economist's essay on the Economic Organization of Palestine (Himadeh) says in support of this argument:- " At present the hot springs of Tiberias and El Hamma attract a limited number of people from Palestine and Transjordan and a lesser number from adjacent countries, but the chances are good that they will attract more people from these territories and from other countries when their therapeutic and balneologic use becomes better known and more modern accomodations are built.

No special type of Architecture has been chosen for the project , however, an attempt at purely functional design was made where no unit or decorative feature has any right to exist if it is of no primary use.

A trip to the site has been rendered impossible by the present political situation. A cadastral plan is also unavailable. The location plan submitted with this thesis has been drawn from memory by a former official of El-Hamma company and the writer of this thesis to whom the site is very well known.

CHAPTER I

EL-HAMMA AS IT IS NOW

The concession area lies on the boundary of Palestine at its Northeastern end at the corner of a narrow strip a few hundred yards wide and about four miles long with a total area of 209 dumums. On one side of the strip is Syria and the other side is Transjordan. In this strip runs the Yarmouk river down to the Dead Sea. It is about 500 feet below sea level, embraced on both sides by hills rising up to 1000 feet in a distance of about 5 miles.

The concession area itself is practically flat except for 2 or 3 slight elevations. On one of these elevations lies an old synagogue with beautiful mosaics still in good condition. Fallen columns, entablitures etc. can still be found in that area, which are said to be the ruins of ancient Roman Thermea and theatres - a proof of the ancient fame of these mineral waters.

Being under sea level and surrounded by hills on all sides the climate of El-Hamma is mild and dry in winter and hot in summer

7.

very often unbearably so. Such a climate proved highly favourable for mosquitoes, and malaria used to ravage the place all the year round with the exception of the Spring season. However the concessioners fought the disease hard and were able to uproot its causes for good.

COMMUNICATIONS:

There is a Railway station close to the concession premises on the Haifa-Damascus Railway, and passenger trains stop once daily in this station going each way. An asphalt road which was improved recently runs between Tiberias, Samakh and El-Hamma on which two Bus Companies run their buses between Tiberias and El-Hamma several trips daily.

SPRINGS:

The El-Hamma Springs are three in number, the MAQLA, the BALSAM, and the REEH, coming out at a distance of about hundred to two hundred yards from each other (Their approximate positions are shown on the location plan.) These Springs give an average of about 60 to 100 gallons of mineral water each per second, or about 15,000,000 gallons per day for the three springs. They all contain much radio-active matter. There is also a spring of sweet water excellent for drinking purposes which is the most radio active. The output of this spring is approximately 50 gallons per minute.

1. El-Maqla

It is the hottest spring with its temperature rising up to 49° C. (about 120° F.) and is reputed to be therapeutically the most

efficacious. The water bubbles up from the bottom of the basin; it is crystal clear of a blue colour and smells of hydrogen disulfide. The bathing accomodations for this spring are the following:-

Two large buildings one for men and one for women. Each building has two pools, first and second class; and each pool has a rest room.

Two private pools for families.

Eight private baths; each with two dressing and rest rooms

However the condition of these accomodation and their layout justify the erection of something more efficient in their place.

2. El-Balsam

The Spring bubbles up from the ground releasing a good deal of hydrogen disulphide gas. The water is beautifully clear of a deep blue colour but smells and tastes strongly of hydrogen disulphide. Its temperature is 39° C, or about 104° F.

The bathing accomodations consist of:-

Four pools (relatively small in size)

Two first and second class for men and the same for women; each pool has a small rest room. These are in addition to private pools of the families.

On one side of the building lies the drinking water spring. Close to it there is a large pond of dark blue water into which

flows the Balsam waters. The pond drains into the river. Behind the bath lies a grape fruit grove. To the east of the pool rises the elevation which is thickly forested with tall Eucalyptus trees and on top of which lies the ancient synagogue. All these features combine to make the site of El-Balsam the most picturesque and colourful in the whole area.

3. El-Reeh:

This spring too wells up from the bottom of the basin. This bath is one which is mostly frequented by visitors of good physique. Its top is just hot enough not to disturb the external body temperature, i.e. about 35° C (95° F.)

The bathing accomodations consist of:-

Four pools, two, first and second class for men and the same for women.

Each pool has the semblance of a rest room.

The pools are definitely not spacious enough for the many users of this bath being the most desirable and refreshing.

The most striking fact about all the springs is that their waters never stagnate, but are constantly flowing out so there is no possibility of infecting or coneminating the springs. However, with the present arrangement the water in the first class

pools flows into the second class pools and out into the drains. This is one of the main reasons why the rebuilding of all the bathing accomodations is necessary.

The water of Reeh drains into a closed under ground duct which passes by Al-Maqla and collects its water. Proceding from there as an open canal running parallel to the river bank, it passes by the villas collecting their waste water and pours finally into the river.

A detailed description of the baths and their sites has been given because they are the main item of study in this paper.

The other accomodations existing in El-Hamma at present are:-

1- Doctor's home, clinic and offices which are in good condition and can be included in the new plan.

2- Hotel of 30 rooms and a Kosher Restaurant which can be kept in the new plan as a second class hotel. It is U-shaped facing the river.

3- One spacious casino and coffee house newly built and can be kept also.

4- Seven villas, furnished: each contains two double-bed rooms, kitchen, lavatory, bathing pool, one large screened terrace and one small verandah. Water is conducted to the bathing pools in pipes directly from the Maqla Spring.

These villas will be kept with slight reparations and polishing up as second class villas in the new plan.

5- Three blocks each containing six poorly furnished suits and each suit containing one large bedroom, one kitchen and one lavatory.

6 - Twelve blocks containing ninety two rooms, all furnished (very poorly) used for dwelling purposes and offices.

These last two items should definitely be demolished because they stand on the best part of the area (the central slightly elevated plot) and are atrocities from the points of view of comfort sanitation and beauty. Their structural condition also justifies their destruction.

The present accomodations would have been satisfactory for the people who frequented the sites in the thirties, for then it was only the sick who had enough reason to undertake such a pains-taking journey. But now with the rapid change in the standard of living of the people of these countries and with the transport facilities encouraging the healthy and wealthy as well to spend their winters in such a place, the need for a more modern and efficient planning of the whole resort becomes pressing. Many are the people I know who would not go to Hamma, although they'd love to , merely because the accomodations are not up to a desired standard.

An attempt at a replaning of the whole of El-Hamma is much

more than this thesis can aspire to. Therefore the study has been confined to the architectural design of the Three Main Buildings in the resort, namely the bathing accomodations, the central buildings and the villas.

The next chapter is only a set of suggestions with a proposed lay out for the resort.

CHAPTER II

AL-HAMMA-TO-BE

As it is Al-Hamma received a maximum number of visitors of 1400 a day for the whole month of April in 1936. In 1943 the number of visitors who stayed in the premises for their cure amounted to 16,728 persons; and those who came for their baths and left the same day amounted to 29,338 or a total of 46,066 for the year. Corrugated iron sheds and tents had to be used especially at maximum capacity.

In the replanning of El-Hamma accomodations should be built to house the number of people during maximum visitation namely 1200 - 1500 per day and leave space enough for any future development.

The river bank to a distance of 50 meters inside the concession area and extending from the position of the old villas northward is reserved for public parks and play grounds.
A plaza is built at the centre of the area with the central building at its north and south ends. From this small plaza roads and foot paths diverge in different directions as shown in the plan.

The baths are erected at the present sites of the Springs. Accomodations are distributed as shown in the location plan.

The new buildings to be added to what is to be left of the old accomodations are:-

1 - Two first class hotels with spacious general restaurants.

2 - Twenty five villas of the same style built between the Maqla and Reeh Springs. Water from Maqla and Reeh are to be taken to their bath rooms.

3 - Seven more villas, similar to the above, will also be constructed near the Balsam Spring with Balsam water reaching ~~its~~ their baths.

4 - Twenty five blocks each containing six furnished suits consisting of one large bed room, one kitchen and one lavatory. Eight lodging houses each, housing 50 people.

5 - A bus Station.

6 - One club building with sweet water swimming pool, inside tennis courts, ping pong room etc.

7- Administration offices with a block of flats for permanent officials and their families.

These accomodations can house the folloiwng:-

2	Hotels (1st class)	300 people
1	Hotel (2nd class)	100 people
40	Villas (with 6 each)	240 people
150	Furnished suites with 3 each	450 people
8	~~Bar~~ Lodging Houses with 50 people each	400 people
		1490 people

All roads are asphalted. The main road leading to the plaza is 15 meters wide and the rest not more than 10 meters wide. At the sides of the roads leading to the baths, sheds with benches underneath are erected at intervals to protect the bathers from the scorching sun of the rift valley and from rain during winter.

The location plan and this short explanation will give an approximate and fair idea of the standard of planning I am aiming at and will explain partly the existence of luxuries in the main buildings that seem at first sight quite unnecessary.

And now having studied Al-Hamma as a whole we proceed to an architectural study of the surroundings and the main buildings namely baths, Central Buildings and villas ~~etc~~.

CHAPTER III

ARCHITECTURAL HINTS

Architecturally a building is not merely the expression of the Architect's own fancies, character and individualistic traits; nor is it only the expression of its own function - it is also the reflection of its surroundings, reflecting back the character of the country around with simplicity and honesty.
Another minor factor that gives a building a special architectural feature is the climate; in a hot district where the sun's glare and heat are objectionable, the façade of the building usually consists of covered balconies with receeding rooms thus giving a dark toned façade which gives a feeling of coolness and pleasant shade.
The openings in such a district are usually projected or made small in size.

Taking El-Hamma as our specific example we will study the best architectural form and features that are dictated by the last mentioned factor.

An imaginary trip from Samakh to Hamma will bring up in relief the character of its surroundings and climate.

The starting point is at the shore of the Lake of Galilee. Green fields extend as far as one can see. The road twists among the Eucalyptus trees for a considerable length. ~~Through~~ The green disappears and white-yellowish barren mountains prop out with alarming and ugly suddenness. The climb starts up these mountains most of the way at the edge of a long and huge precipice at the bottom of which runs swiftly the river Jordan. The cliffs are long, high and solid. The breeze up at the top is slightly warm. For a few kilometers one finds himself in a barren country exposing its rugged bosom to the scorching sun. A curve brings Hamma into view - a patch of green with a silvery glistening river cutting it across and separating it from the barren hills similar to the ones left behind rising at the opposite side. The descent starts, the road is dangerously steep and the increase in temperature becomes uncomfortably noticable. The black basalt stones give the whole area a dark tone that contrasts shockingly with the white ruggedness of the hills. At noon the heat is quite excessive.

The main characteristic of the area is thus the sharp contrast that forces itself upon the observer at first sight; the patches of rich green thrown against a background of utter desolation, swift, warbling river breaking the monotonous silence of that is characteristic of hot areas; the cool breeze of the evenings and the unbrearable heat at noon; a flat spot surrounded by rising hills on all sides.

With a full picture of the country as a Landscape Architect sees it for the first time we will proceed to a detailed study of the buildings themselves.

CHAPTER IV

VILLAS

Before studying the building itself I'll mention a few factors that have a bearing on the design of all the buildings in that area.

1) All pipes carrying mineral water should be of clay because by experience it was found to be the only material that could stand well the chemical abrasive action of the minerals in the water.

2) The doors and windows of all rooms especially bed rooms should be protected from the direct rays of the sun by covered balconies.

3) The prevailing wind in the area comes from the North West thus the bed rooms for all buildings should whenever possible face this direction.

4) All drainage, sewage, and liquid refuse should be taken to the river at a point at least 200 to 300 meters downstream away from the extremity of the built up area. This of course does not include the used mineral water coming from the baths or villas.

5) Use is to be made of the local yellowish stone since ~~they~~ it ~~are~~ abundant at the site and keep the texture and general character of the buildings in harmony with those of the district.

6) Sheds with seats should be provided wherever possible as a protection for pedestrians against the heat of the sun in summer and rain in winter. These should definitely be built at the sides of the roads leading to the public baths.

7) Knappen or any other kind of hollow blocks should be used for partitions as they are good insulators.

VILLA:

The building can hardly be called a villa; actually it is a hybrid of a villa, a cottage and a bungalow. This cooking of a type of buildings out of its three origins was found necessary for the following reasons:-

a) A villa, beside being expensive and taking a lot of precious space, is difficult to furnish properly and economically. Compactness being desirable when it is not acquired at the expense of comfort.

b) A cottage is too small for a family with a car (a family hiring a villa in such an out of the way place must have a car) and a lot of storage area is required since families bring all their supplies with them, Al-Hamma being an isolated place.

c) Again a cottage is too small since the occupants have to have most of their amusements at home, the resort supplying few of that nature (no cinema, theatre etc.) for this reason the living and dining rooms were made spacious.

d) From the bungalow only the idea of surrounding balconies was borrowed. The size and accomodations being too small and few for the same reasons that those of the cottage are not sufficent.

For lack of another name the building has been and will be called a villa. The study of the villa will be divided into two parts:

i) Study of the plan and

ii) Study of the front elevation.

i) Study of the Plan:

(Refer to the fig. on the next page)

Total built up area is 408.78 sq. ms.

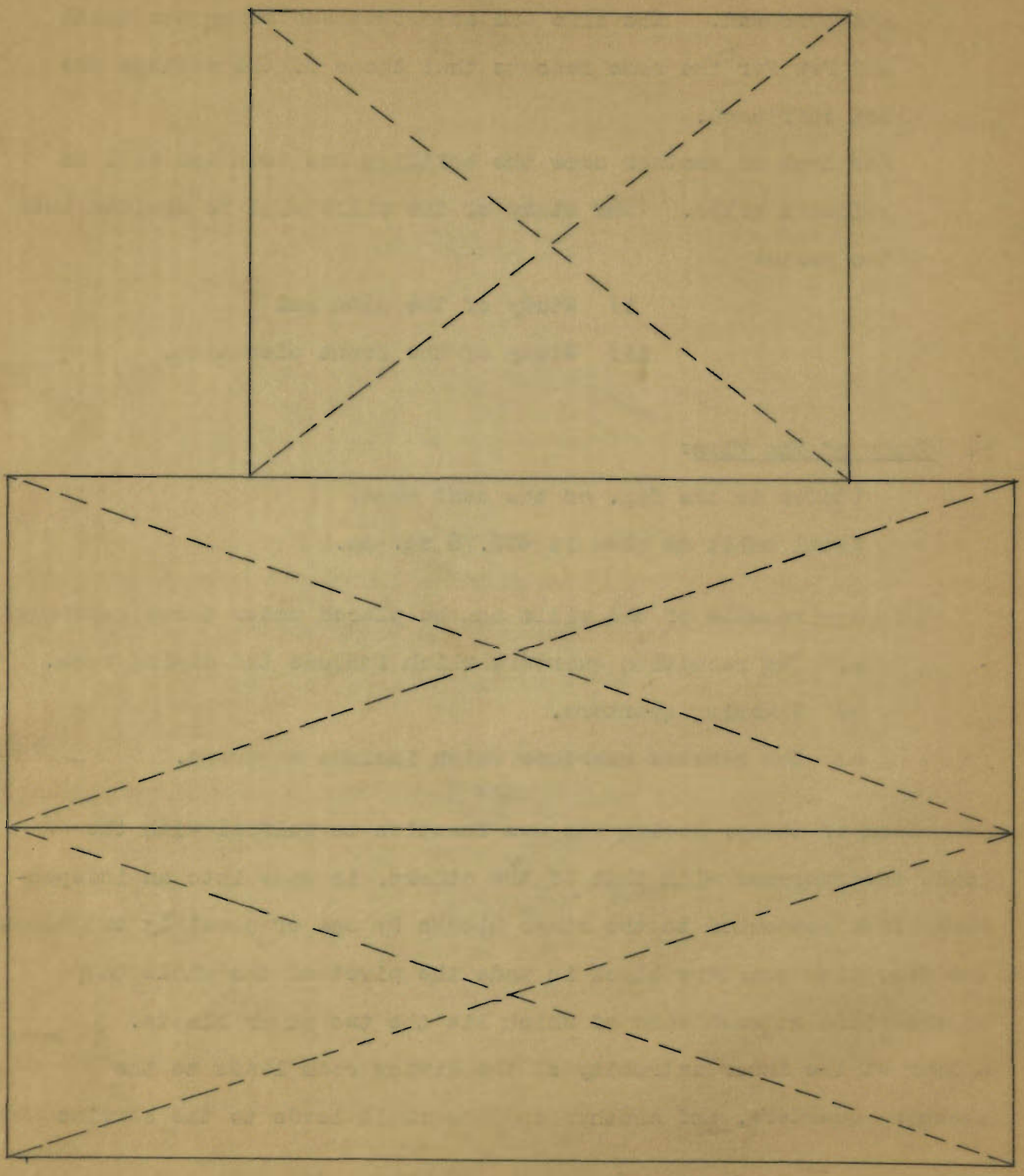
The requirements of the villa can be placed under three headings:

a) The reception quarters which include the dining room.

b) Sleeping quarters.

c) The service quarters which include a garage.

Each of these, having its own function to fulfill with the least interference with that of the others, is made into an independant block connected to the other blocks by one or possibly two doors. The reception quarters block is made the pivot of the whole body of the villa at each side of which lie the two other blocks. A door at the inner extremity of the living room leads to the sleeping quarters, and another opposte to it leads to the service



quarters. The dining room also has a door leading indirectly to the kitchen.

a- Reception Quarters: Floor area = 107.4 sq. ms.

The entrance door leads directly to the living room without any vestibule because in resorts formality is rarely a necessity or even desirable. The dining room is separated from the living room by a long panel ~~and~~ glass door in a way that the two can be used as one big hall in case any need for such a hall arises.

b- Sleeping Quarters: Floor area = 136.88 sq. ms.

These are placed in such a position that no matter which direction the villa faces at least two of the three bed rooms receive the prevailing wind, (with the condition that when the right elevation faces the north west - direction of prevailing wind - the windows of the two extreme bed rooms have to be punched in their right wall overlooking the entrance and dining room balconies.

The balconies surrounding the bed rooms serve as a covered small terrace, and a protection against the scorching rays of the sun. The columns can be dispensed with if it is structurally possible.

The three bed rooms have two bathrooms with two sharing one bath room and the third, which is supposedly the master's bed room (head of the family and his wife) has a private bath.

The corridor connecting all the bed rooms is long; but this could not be avoided with the arrangement of the bed rooms as shown.

c - Service Quarters: Area = 164.5 sq. ms.

All the units of the service quarters are connected together by one corridor which leads directly to each of the reception rooms. Ample storage room is supplied not merely for the use of the occupants, but also to store the valuable furniture that has to be locked in when the building is unoccupied. The maid's room is made big enough for two maids.
The wash room, which at the same time serves as an oriental bath room to be used by the maids, is a necessity in such a place as Al-Hamma where washing the laundry is a daily routine (from mineral water smell and heat).

The service quarters have their own entrance door and balcony at the back thus isolating these quarters completely from the other two and offering no interruption to their functions.

ii) Front Elevation:

The whole facade is based on a balance of the masses of the 3 blocks. Three elevations are used thus:-

reception quarters 4.2 ms high (from floor to ceiling)

sleeping quarters 3.6 ms.

Service quarters breaking into two elevations 2.6 ms for the garage and the rest 3.6 ms for same as sleeping quarters.

The whole building with the exception of the garage is raised 90 cms from the ground level with six steps of 15 cms rise leading to the terraces. Over the roofs the parapets are 90 cms high.

The central block being highest of all forms the heavy unit to which all the others cling. The lowest of the blocks namely that of the garage is the only moving part with its long horizontal row of corridors, its motion towards the right is counterbalanced and checked by the stationary bulk of the remaining blocks. Two pergolas, one over the sleeping quarters block and the other over the service quaters block, raised above the level of the central block give the impression of supporting the towering mass and fill in the blankness of the wall over the covering slab of the entrance terrace.

A steel ladder is fixed to the northern wall of the garage and another to the right wall of the maid's room in order to reac h the pergolas. A similar ladder runs up to the roof of the reception quarters.

The walls are built of rock faced yellowish lime stone. All the columns are built of black basalt as well as the small partitions between windows thus 

The steps will be of ordinary dark mosaic. These mosaic steps, the black streaks of basalt stone in the limestone façade will, in a refined manner, reflect the barren whiteness

of the hills studded by scattered boulders of basalt, and the dark green against the rugged white hills. However the surrounding balconies ~~terraces~~ lessen the harshness of the contrast.

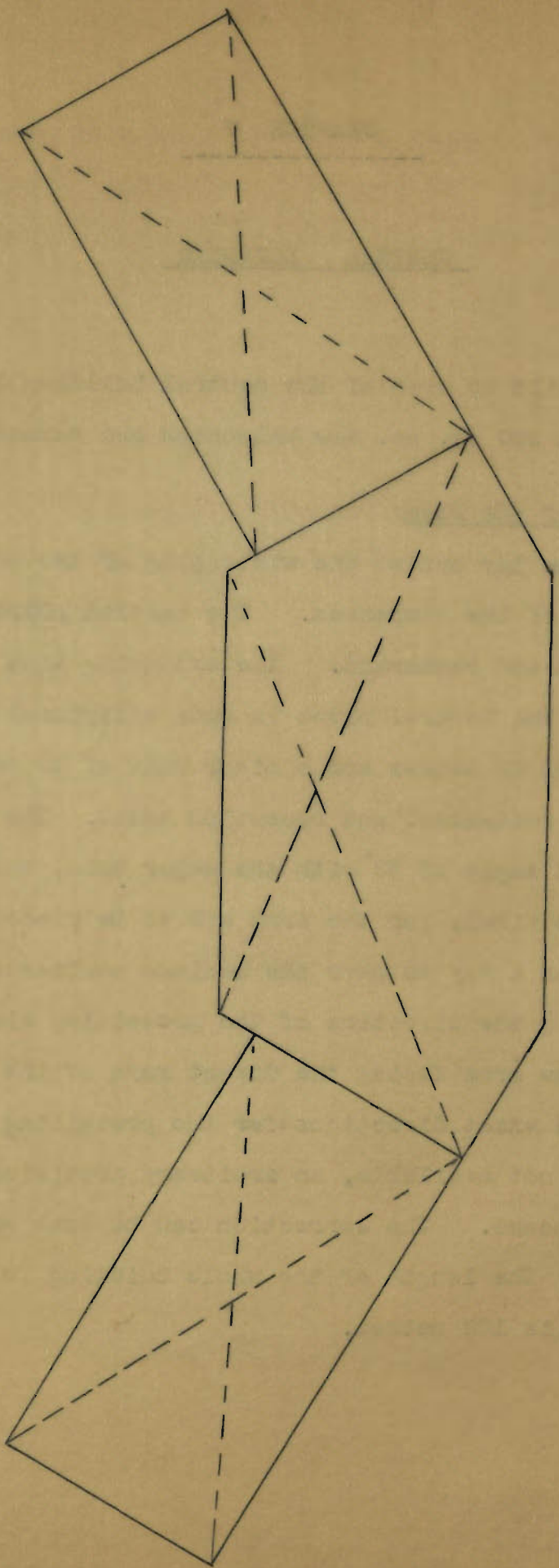
CHAPTER V

CENTRAL BUILDING

Total built up area of the central building is 2289.20 sq. ms. of which about 200 sq. ms. are balconies and verandahs.

1) Study of the Plan:

The lay out of the whole plan of the hotel is derived from the form of the compasses. The central pivot has the entrance, reception hall and restarant. The extending arms contain the bed rooms. The Central pivot is made elliptical in shape with a major axis of 28 metres and a minor axis of 20 metres (net dimensions of restaurant and reception hall). The arms are laid at an external angle of 30° with the major axis, however, this angle is by no means final, for the arms are to be placed around the central pivot in a way to have the maximum surface area of the building facing the direction of the prevailing wind, and the minimum surface area facing the direct rays of the sun. Since data as to the exact directions of the prevailing wind, sunrise and sunset is not available, an arbitrary provisional amgle of 30° has been chosen. The correction can be done when such data is available. The length of the whole buidling following the exterior wall is 122 metres.



The hotel is designed to house and feed 150 people beside feeding a part of the occupants of the lodging houses. The exact number will be given in the discussion of the ground floor plan.

a- Ground Floor Plan:

The elliptical central pivot is divided roughly by two curving cut-off walls into two, the reception hall close to the main entrance, and the main restaurant at the other end. An additional small dining room (furnished more carefully) lies close to the main restaurant. The total floor area of both dining rooms is 278.2 sq. ms. Thus 222 people can be fed at the same time in both dining rooms allowing for each person a floor area of 1 1/4 sq. ms. If meals are given in two rounds a total of 444 people can be fed at each meal, 150 being lodgers in the hotel and the remaining 294 people from the community, particularly the occupants of the lodging houses and people who come to the place for one day only. A bar, kitchen, store rooms and pantry for the kitchen along with toilets for the use of the diners are provided. The kitchen and its store rooms have their own back entrance. The manager's office is placed at the right of the entrance thus giving him the opportunity to watch what is going on in the hall and see the people coming in and out of the rooms.

The two wings are practically symmetrical containing each a big store room for blankets, sheets, bed-steads etc. All the rooms in this floor have two beds each with a private bath and small

private dressing room with a built-in closet. Each room also has its own balcony. At each end of the extended arm there is a big terrace about 35.6 sq. ms. in area for the use of the lodgers of that block. The whole floor contains 20 double-bed rooms thus housing a maximum of fourty people at the same time.

First Floor Plan

The steps coming up on each side of the ellipse do not lead directly to the upper ellipse; instead they lead to the main corridors so as not to have people crossing the sitting room whenever they want to go down to the ground floor or up to the rooms. The plan of this floor differs from that of the ground floor in three respects.

a) The position of the store rooms is changed and they are smaller than those of the ground floor.

b) The elliptical hall is divided into a large sitting room and bed rooms.

c) This floor contains suits consisting of a bed room, a living room (which can be turned into a bed room), and a bath room.

In this floor there are eighteen double-bed rooms and eight suits. Each suit and bed room ~~also again~~ has its own private bath and dressing room with a built-in closet. All rooms have their private balconies with the exception of two suits which have to share a balcony with another suit or else remain without one.

Supposing that two people occupy every suit (which is a bare minimum) the occupants of the flat will amount to 52 people. The central sitting room is spacious enough for 52 people, in fact a little too spacious having a floor area of about 200 sq. ms.

Second Floor Plan

The central ellipse is the same as that of the first floor, however the two differ in two respects.

a- The second floor contains private rooms.

b- These private rooms have their baths close to the wall of the main corridor lit from sky lights which also act as ventilators.

The floor has fourteen double-bed rooms which can be used also as single-bed rooms at a greater expense, sixteen private single bed rooms and four suits. The maximum number of occupants of the floor amounts to fifty two people supposing that the suits will house an average of two people each.

The stairway continues up from this floor to the roof where a large shed 3.5 ms. high is supported on columns covering the whole area of the central ellipse (including the verandahs) and and given its shape. The side store rooms of the first and second floors are also continued up to the same height serving as store rooms for chairs, tables etc that have to be used when the roof terrace is in use.

The skylights extend from the corridor wall to the exterior wall at a height of 2 metres, and the glass openings are at the top and the side flush with the exterior wall.

The exact total number of occupants of the whole hotel is ~~thus~~:

Ground Floor	40
First Floor	52
Second Floor	52
	144

ii) Study of Elevation:

Only the front elevation will be studied since the back elevation is roughly the same, and the side elevations are of no significance.

The most important feature of the elevation is not as in the case of the villa an intricate balance of masses, but a balance of vertical and horizontal motions and a rhythmic change in the shade and tone of the surface. However, this does not mean that the balance of masses does not play a role in giving the building its character. On looking at the perspective one notices that the motion suggested by the long angular arms is just checked by the stability of the vertical central elliptical mass. The two arms are made the same height, the same length and given exactly the same features. In the making out of the facade the three blocks, i.e., central and the two arms, are in broad outline ~~made~~ balanced;

then each of the blocks is taken as a unit by itself and balanced. The change in shade and tone is secured mainly by taking advantage of the fact that the bed rooms walls should not be exposed to the sun's rays directly. This is done by having the walls of the bath rooms flush with the exterior wall and those of the bedrooms receeding the width of their balconies. Thus as the sun strikes the exterior wall the contrast between the dark recess of the balcony and the bright blank wall of the bath rooms gives a pleasing as well as rhythmic change to the wandering eye.

The alternating dark and light rhythm proceeds in a horizontal direction in both arms. To counter balance this motion of the rhythm, high vertical windows at the inside ends of the arms are built giving light to the staircase rooms.
The horizontal and vertical motions of the rhythmic change in tone magnify the horizontal and vertical contrast of the lines of building but keep the balance in the same degree.

The central block is a vertical alternation of light and shade with another recessed rhythmic change of light and shade inside the first shade. To break this central part from the outgoing units and high blank wall is left on each side. This break will offer a resting point for the eye and the intricate and somewhat crowded balance of tones. Besides, the blank wall stresses the vertical stability of the central block.

The main acheivement in the arrangement of this façade of this building is the fact that it immediately gives the impression of being a hotel,in other words suggests its function.

All columns and window partitions are built of dark basalt stone; the rest of the building of limestone. This contrast in the colour of the material combined with the dark and light shades of the facade keep in a refined manner the general contrasting character of the surroundings.

Thus the three factors mentioned in chapter three i.e. Function, Surroundings and Climate are combined to give the building its character.

CHAPTER VI

BATHS

The sites of the baths in the case of Al-Hammah are dictated by the position of the mineral springs themselves. But the recommendations given are useful in the planning of the rest of the resort thus placing the baths in the desired sites with respect to the rest of the building, streets. etc.

The Public baths need not necessarily be situated in a prominent main street but the site selected should occupy a central position, should be obtainable at a moderate cost or in this case reached in a short time, and should be easily accessible from all parts of the district within its municipal area.

i) Study of Plan:

The positions of the swimming baths usually govern the arrangement of the other departments, but the bath designer must bear in mind the fact that it is absolutely necessary to provide direct access from the principal entrance to the various suites of baths, in order that the cost of administration may be

reduced to a minimum, and that each bath hall and each department of baths should be planned as it would be if it were a seperate self contained building.

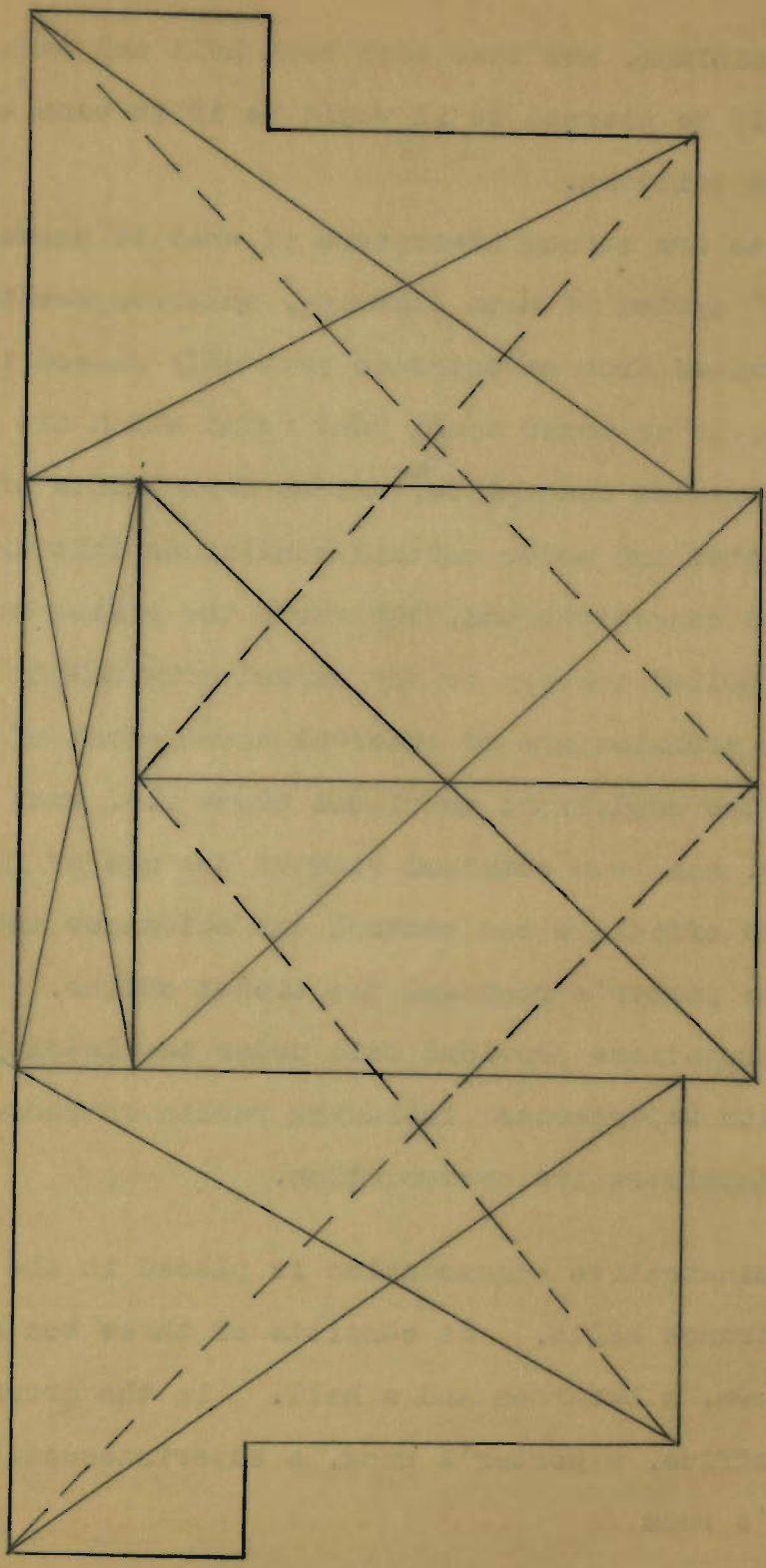
Some architects are strong advocators of what is known as the "quadrangular" system of bath planning, an arrangement where by access is obtained from an entrance centrally placed in the street façade, to an inner court yard round which are grouped the subsidiary entrances leading to the various departments of the buildings. For certain sites and under certain conditions this arrangement is a suitable and convenient one, but where the system has been used it has not supplied the key to any marked originality of treatment wither in the architecture or internal arrangement of the buildings. In this case the conditions mentioned above i.e. easy access to all baths etc. has been obtained without the use of the quadrangular system and the officials can control the entrances and exits to all units from the porter's room and the ticket office.

The accomodations provided fall under two leading divisions:

a- Bath Departments including public entrances.

b- Administrative accomodation.

The adminstrative accomodation is placed in the first floor above the entrance halls. It consists of three bed rooms, a store room, a kitchen, a bathroom and a hall. In the ground floor there is a ticket office, a porter's room, a superintendent's office and a matron's room



The bathing departments include:

i) Men's first class slipper baths
ii) Men's first class swimming baths.
iii) Men's second class swimming baths.
iv) Women's first class swimming baths.
v) Women's first class slipper baths.
vi) Women's second class swimming baths.
vii) Toilets, rest rooms, locker rooms et.

As a rule the internal arrangment of any large building is determined by the position assigend to its most important (most used) room or department. From experience it was found in Hamma that the second class swimming baths received the greatest number of visitors. Thus the second class swimming baths are made a central block at the right of which lies a unit containing men's first class slipper and swimming baths, and at the left the women's first class slipper and swimming baths.
The arrangement of the units as made in this manner not only to keep the "class" units as individual blocks, but also to seperate the accomodations for men and those for women efficiently.

Two entrances, one for women and another for men are built not simply to comply with the traditions of the country but to facilitate the management and attendance, and to give more freedom to each of the sexes once they are in their own area. The entrances lead to a large and lofty entrance hall with a ticket office centrally

placed and subdivided by a glazed screen some seven or eight feet high into two lobbies each of which is controlled by one of the ticket issuing windows. All the rest of the bathing departments are easily accessible from each of the lobbies.

SWIMMING BATHS:

The men's and women's first class swimming baths are made identical, and so are the second class baths.

First Class:

The centre of the ~~whole~~ hall is occupied by a basin 22 x 13 ms, one metre deep at the shallow end and 2.5 metres at the deep end. A 1.5 metre gang way surrounds the basin. Around the gang way run three parallel steps each 50 cms. wide to serve as seats. A row of dress boxes 1.40 x 1.20 cms. separates these steps from a 2 metre corridor running all around the building, The dress boxes open to this corridor. Although the attendance on the bathers requires more workers with such an arrangement, yet its sanitary advantages are worth the additional expense for a first class unit. In this way no one enters the bathing area proper with his boots on.

Second Class:

The above arrangement is not economical for the second class swimming baths since strict attendance there is essential, the number of bathers being much greater. The dress boxes, 1.20 x 1.20 metres are thus thrown against the wall all along and open directly to the two metres gangway which acquires a width of 2.5 ms. at the short sides of the basin. The basin itself is 14 x 33 mrs.

Slipper or Private Baths:

Each bath has its own dressing room 2.65 x 2.0 ms. The bath room itself is 1.80 x 2.65 supplied with a tub into which pours fresh as well as mineral water. The two rows of baths are separated by a 2.0 metre corridor. The inside row of baths received its light and air from skylights.

The lighting of the swimming baths is accomplished by having ~~two~~ long rows of high windows wherever this is possible. However, these are not enough and skylights become a necessity. These are built on each side of the arch crowns in long rectangular panels between the ribs (the ribs occur at intervals of 6 ms.).

An objection may arise as to the excessive size of the building (104 ms. long). At present at least two buildings house its accomodattions. The question of whether it is better to build one huge building to take the place of two is one of economy. Architecturally both have equal possibilities. The knowledge of the author can hardly qualify him to decide such a question.

Study of the Elevation:

Structural limitations play a part in giving the building its character. The large column-less spans over the swimming bath rooms necessitate the use of arched roofs. Thus the unconcealed series of arches dictate the treatment of the surfaces below. The arches give the observer a feeling of stability, an impression of fixing the whole structure to the ground. The only way to counteract this exagerated feature is to give the observer a feeling of motion in two opposite directions from beneath the arches. This is obtained by elongating the front unit at a lower level (the unit containing the private slipper baths.) Thus no intricate balance of masses has been used to give the building its character as is the case with the villa; instead a contrast of direction has been utilized to release the downward pressure, so to speak, of the central mass.

To give the building the stamp of its special function the rectangular row of windows is topped by the circular windows of the skylights. The openings of the central block which form the entrance halls and administration accomodations are made in a way to give the general impression of a central flat arch.
To keep the contrast in the texture of the surroundings, the same idea used in the other buildings is used here, namely, building the columns and small partitions between the windows of basalt stone; the rest of limestone.

APPENDIX

This appendix contains the complete analysis of the sweet and mineral waters of El-Hamma as reported by the Public Analyst Laboratory of the School of Pharmacy of the American University of Beirut at the request of the holder of the Hamma Concession Mr. Suleiman Bey Nassif.

ANALYSIS

PUBLIC ANALYST LABORATORY
SCHOOL OF PHARMACY

AMERICAN UNIVERSITY OF BIERUT
BEIRUT, LEBANON

Analysis No 22-24/32
Sample rec'd, Nov. 27, 1932

Beirut, April 5th, 1933

For whom made: - Suleiman Bey Nassif, Haifa.

Origin of Sample: - Collected at El-Hamma by the analysts.

Nature of test : - Complete mineral analysis.

RESULTS

All figures, unless otherwise designated, are PARTS PER 100,000

Thermal Springs of El-Hamma on the Yarmuk.

	EL-MAKLA (Hammam Selim)	ER-RIH (Errih)	EL-BALSAM (Al-Jarab)
Color of water	Slightly bluish in all three Springs		
Odor of hydrogen disulphide	Faint	very faint	Quite strong
Taste, pleasantly sulphurous & mildly salty		Faintly salty	Faintly salty
Sediment in samples taken	nil	nil	nil
Temperature at source °C	47.0	35.8	40.5
Reaction to litmus	Neutral	sl Basic	sl Basic
Reaction after 20 days	pH 6.8	pH 6.8	ph 6.6
Normal carbonate alkalinity	nil	nil	nil

	EL-MAKLA (Hammam Salim)	EL-RIH (Er-Rih)	EL-BALSAM (Al-Jarab)
Bicarbonate alkalinity ($CaCo_3$)	32.80	33.94	33.91
Bicarbonate (HCO_3)	40.02	41.40	41.38
Carbon dioxide as bicarb(CO_2)	28.86	29.86	29.84
Bound Carbon dioxide (Co_2)	14.43	14.93	14.92
Half bound carbon dixide(CO_2)	14.43	14.93	14.92
Free Carbon Dioxide (CO_2)	5.40	3.40	3.34
Hydrogen disulphide (H_2S)	0.67	0.27	0.45
Hardness, total ($CaCO_3$)	45.20	43.62	48.16
Chlorides (NaCl)	45.80	30.20	30.60
Chlorides (calcd. as Cl^-)	27.80	18.33	18.57
Sulphates (SO_3)	16.35	15.09	13.98
Sulphates (Calcd. as SO_4)	19.62	18.11	16.78
Total residue at 100° C.	132.50	72.50	85.60
Total residue at 180° C.	117.7	55.43	71.65
Loss between 100 and 180° C.	14.8	17.07	13.95
Silica (SiO_2)	0.53	0.50	0.75
Iron Oxide and Alumina (Fe_2O_3 and Al_2O_3)	1.78	0.22	0.15
Calcium Oxide (CaO)	15.95	11.65	18.83
Calcium (calcd. as Ca^{++})	11.40	8.33	13.46
Magnesia (MgO)	6.81	9.25	5.92
Magnesia (calcd. as Mg)	4.11	5.58	3.57
Potassium as (KCl)	0.20	0.25	0.18
Bromine	traces	traces	traces

	EL-MAKLA (Hammam Selim)	ER-RIH (Er-Rih)	EL-BALSAM (Al-Jarab)
Radioactivity, compared with standard, cf. below	(0.09 X)	0.12X	0.24 X
Probable Combination			
Magnesium bicarbonate $Mg(HCO_3)$	24.70	33.57	21.77
Calcium bicarbonate $Ca(HCO_3)_2$	25.80	17.92	30.85
Calcium Sulphide (CaS)	1.40	0.57	0.95
Calcium Sulphate ($CaSO_4$)	14.45	12.16	18.01
Sodium Sulphate (Na_2SO_4)	19.48	17.27	10.70
Sodium Chloride (NaCl)	45.80	30.20	30.60
Silicic acid (meta) ($HSiO_2$)	0.54	o.51	0.77
Iron and Alumina salts (As Oxides)	1.77	0.22	0.15
Potassium Chloride (KCl)	0.20	0.25	o.18
Sodium Bromide (NaBr)	traces	traces	traces

N.B The radioactive standard was a solution of Barium Radium Bromide containing 1.22X10- Gms of radium per cubic centimetre.

These waters would be rated as thermal, sulphurous, radioactive waters valuable for bathing as well as being medicinally potable.

REMARKS

The details of the methods used will be furnished upon request.

The air temperature was 19° C. at the Springs when the measurements there were made.

All numerical results are parts per 100,000 or centigrams per litre unless otherwise designated.

As far as medicinal standards are established to date, these waters would be considered safe to take internally from the radioactive standpoint - they contain both dissolved radioactive salts and emanation - and a total of 5000 litres would have to be drunk before possible toxic effects could set in. The water from Ain-Bulos would probably be more pleasant to take internally, and these spring used mostly for bathing, except where sulphur taken internally is desired.

F. Antippa, M.S.

Tested by R.J.Pauly, Ph.D & F Istfan PhC.

PUBLIC ANALYST LABORATORY
SCHOOL OF PHARMACY

AMERICAN UNIVERSITY OF BEIRUT
BEIRUT, LEBANON

Analysis No. 25/32.
Sample rec'd, Nov. 27, 1932.

Beirut, April 5th, 1933

For whome made: - SULEIMAN BEY NASSIF, HAIFA.

Origin of sample:- Collected at 'Ain Bulos (Cool sweet-water spring near Balsam spring at El-Hamma) on Nov. 27, 1932, by the analysts.

Nature of test: - Complete water analysis.

RESULTS

All figures, unless otherwise designated, are prts per 100.000.

Color	Water white
Odor	Nil
Taste	Nil
Sediment	Nil
Temperature at source	22.0
Reaction to litmus	Neutraal
Reaction after 20 days	pH 7.1
Normal carbonate alkalinity	Nil
Bicarbonate alkalinity ($CaCO_3$)	37.24
Bicarbonate (HCO_3^-)	45.42
Carbon Dioxide as bicarb. (CO_2)	32.76
Bound Carbon Dioxide (CO_2)	16.38
Free Carbon dioxide (CO_2)	1.55
Hydrogen disulphide (H_2S)	nil
Oxygen consumed (30 min. at 100)	0.903
Nitrites (NO_2)	Nil

Nitrates (NO_3)	0.042
Free Ammonia (NH_3)	0.0018
Albuminoid ammonia (NH_3)	0.007
Hardness, total (as $CaCO_3$)	38.40
Hardness, permanent (as $CaCO_3$)	15.40
Hardness, temporary (as $CaCO_3$)	23.00
Potassium	Traces
Chlorides (NaCl)	15.2
Chlorides (Calcd. as Cl^-)	9.23
Chlorides (Calcd. as Cl^-)	9.23
Sulphates (SO_3)	14.98
Sulphates (calcd. as So_4)	17.98
Total resdue at 100° C	54.4
Silica ($SiO2$)	0.60
Iron oxide and Alumina (Fe_2O_3 and Al_2O_3)	0.13
Lime (CaO)	13.46
Lime (calcd. as Ca^{++})	9.62
Magnesia (MgO)	5.90
Radioactivity compared with standard (cf below)	(0.27 X)

PROBABLE COMBINATION:

Magnesium bicarbonate	21.70
Calcium bicarbonate	36.28
Calcium sulphate	2.21
Sodium sulphate	24.30

Sodium Chloride	15.30
Iron and Alumina	0.13
Silicic Acid	0.78
Potassium Chloride	Traces

REMARKS

The details of the methods used will be furnished upon request.

This water is 0.27 times as active in radioactivity as a standard solution of Barium Radium Bromide containing 1.22 X 10- gms of radium per cubic centimetre.

This water would be rated as a potable, hard, radioactive water slightly more radioactive, in fact, than the sulphurous thermal springs located at El-Hamma.

Tested by

R.J. Pauly, Ph. D. & F. Istfan, Ph,C.

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