

# ARCHITECTURAL CORRELATION ANALYSIS OF THE HAMMĀMS OF CHERCHELL, ALGERIA: LINEAR VS AGGREGATE SPACE IN THE TRADITIONAL BATH

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## Abstract

*The architecture of traditional historic cities in Algeria has specific spatial and constructive characteristics despite the influence of the Andalusian-Ottoman style. In the case of Cherchell (a historic city 100kms west of Algiers), the architectural elements interpret these architectural references. These elements exist in a complex archaeological, historic and cultural fabric based on architectural and urban analogies, reminders and references. The paper focuses on the typological study of the historic hammāms of Cherchell. It is aimed to analyse the diverse correlations between specific urban amenities and the residential fabric framed within the spatial organization, proportional modulation and structural modes. In this paper, the spatial organisation of the public baths of Cherchell is identified. It is a nodal spiral organization developed around the hot room. It follows the Ottoman spatial prototype of Algiers hammāms. However, the specific characteristic of Cherchell baths is in their constructive system for the roofing covering the central space of the hot room. The roofing consists of an octagonal dome, where the transition to the large square of the hot room is covered by trusses supporting tiled roofing, inspired by the domestic Cherchell architecture of that era.*

## Keywords:

Hammām, correlation; plan/proportion/structure; Linear/Aggregate..

## Historical Background on Cherchell

Cherchell is a small harbour city located 100 kms on the Mediterranean west coast of Algiers, along the feet of the hills, and has its history stretching back to the 5th century B.C when it was populated by the Phoenician. Named IOL capital of the Berber kingdom, it was renamed to Caesarea under the Roman empire. In 1300, Arabs took control of it and was baptised Cherchell (El Bakri, 1965, El Idrissi, 1968).

The history of Cherchell during the Arab era could be divided into two distinct periods:

- o A period of crisis and stratum that lasts till the fall of the 15th century.
- o A second one of a relative renaissance with the coincidence of the arrival of Andalusians and then Ottomans. (Dufourq, 1966)

The notable elements of the urban structure in the middle of the 16th century, denote the integration and the renovation of the roman structures, as it will be mentioned in the next section.



Figure 1: Aerial view of Cherchell in the 1950's (Author's personal archives).

### The role of the archaeological remains in the urban development of the medina of Cherchell

The present form of the medina of Cherchell derives from the superposition and the stratification of various constituents from previous structures. They are in fact, systems of conformations, patterns of utilisation of soil and urbanism orders of different urban cultures, which all together or separately, have contributed to the constitution of the medina of Cherchell. Hence, there is a need to mention the permanent urban grid with its road network and the utilisation of ancient materials found in previous built structures.

### The urban fabric

The forms of mutation of the components of the roman city in the present urban fabric became evident, thanks to the analysis of the patterns of the constitution of the built parts made by the historical centre before the French colonisation. This work has been carried out through the detailed confrontation of cadastral and archaeological plans of the city. Thus, the constitution of the specific fabric is indeed based on an analysis that has dealt with the following aspects: modularity, dimensions and

orientation of land plots.

The character and the specificity of the ancient urban grid directed the urban and architectural structures of the medina of Cherchell since the early medieval period and throughout successive eras (Benseddik & Potter, 1993). This fact has lead to the evidence of the survival of many pre-existing structures, which guided the development of the medina. As a result the following aspects can be noted as follow:

- o The permanence of the Roman urban grid, and its consequences on the "morphogenesis" of the medina with its orthogonal urban land plots and road network.
- o The permanence in the Arab urban fabric of the ancient urban grid guided by a basic pattern called: Actus Quadrata of 120 roman yards, i.e. 35.52 meters x 35.52 meters. (Chennaoui, 2002).
- o The survival of the ancient structural substratum conformed in the superior levels of Arab urban fabric. It has been implemented by numerical acquisition of Roman lands subdivisions by giving sizes to plots of lands, such as: 18 meters x 18 meters, 12 meters x 18 meters, 12 meters x 16 meters.



Figure 2: Views on some old streets in the medina of Cherchell (Source: Author).

### Typology and structure of built forms

The second form of transformation of the components of the Roman city in the medina of Cherchell, has also been put into evidence by the recognition of many pre-existing structures. In this aspect, we can note the following:

- o The analysis of the morphogenesis of the urban fabric confirmed by the high- shaped walls, witnessed of the superposition of structures as often seen with Arab walls are directly built above ancient walls (Ballu, 1922).
- o The reuse of ancient materials in ulterior constructions. Thus, the proximity of these materials in abundance, has determined the choice of the site since the medieval era.
- o The impact of the Roman hydraulic structures on the Moorish Andalusian houses and in certain public amenities such as hammāms (Chennaoui, 2002).

Wells represent another form of an ancient hydraulic element survival, as investigated by the archaeologists in Cherchell. Their edges are often made of monolithic stones over passing 1m in diameter. These wells are different according to their flow and their level even though they have the same level of water.

### From a regular city to an organic medina

Comparative studies carried out on 16th century coastal cities of the Maghreb, led to recognise the existence of non-built spaces, contained between the seashore and the first urban districts of the medina. In the case of Cherchell, the gradual disappearance of the side fringe of a non-built space has become a solution integrated to the system of defence but also a will of location in land slopes (level of 30 meters). This was due, firstly to assure the

gravity of the water direction, supplying all traditional houses built during the Arab-Islamic period, and secondly because of the high-rise and colossal roman buildings (temples, theatres and thermae) which were located in this area; hence providing Arab constructions with on-site local materials.

The urban layout has determined the structure of the medina of Cherchell by spatial divisions of activities and their sites according to their nature and impact such as noisy, dirty; i.e. workshops of blacksmiths and locksmiths districts, and areas of tanning which were supplied by this source of underground water of the thermae at the West (Chennaoui.Y, 2002). Topography plans played an important role in the delimitation of suburbs: high city of dwelling suburbs and workshops, low city of suburbs and barracks, and power (military fortress) and many mausoleums. In this field, the characteristics of the Islamic medina, such as: division of the city on several suburbs according to their ethnic or religious status or economical role, i.e. the workshops networks scattered the long of the streets were maintained in the case of Cherchell. There is also many public squares, free spaces that were usually invested by a coranic school (Zaouia) or a mausoleum.

As a result of this, the medina of Cherchell was defined by two systems of conformation: the permanence of ancient urban grid and the organic pattern of the Islamic city. Several patterns of different urban cultures have contributed together to the constitution of the specific urbanity of the medina of Cherchell, as it evolved from Roman to Arab-Islamic urbanisation (Wirth, 2000).

### The influence of Andalusian culture on Cherchell domestic architecture

The evolution of the domestic architecture (houses) of Cherchell was carried out through gradual historic and cultural evolution. This architecture is the result of renewed experiments and influences spread out through successive eras. Initially the contribution of the Moorish-Andalusian culture was identified in the design of Cherchell houses, dictated by some recall and analogical criteria. This influence was confirmed thanks to a comparative analysis with Granada and Cordoba domestic architecture. Andalousian refugees, who moved to Cherchell in 1496, came from these two cities. The comparison led to identify the following common characteristics:

- o The four slopes of the roof are directed towards the courtyard.
- o The "Skiffa" is a straight entering hall, not bended.
- o Generally, a well occupies the centre of the courtyard. If it dries, an orange/lemon tree or a jasmine plant replaces it.
- o The constant existence of a home garden, irrigated by a well or a tank.
- o The stairs places itself in the courtyard to serve the top floor.



Figure 3: Local courtyard houses from the Andalusian-Ottoman period (1496-1840) (Source: Author).

Since the 16th century, their transcription in the domestic architecture of the medina

of Cherchell was based upon well-defined principles, which were: local knowledge criteria, analogical criteria and referential criteria.

## The Historic Hammams of Cherchell

### A-Public Baths

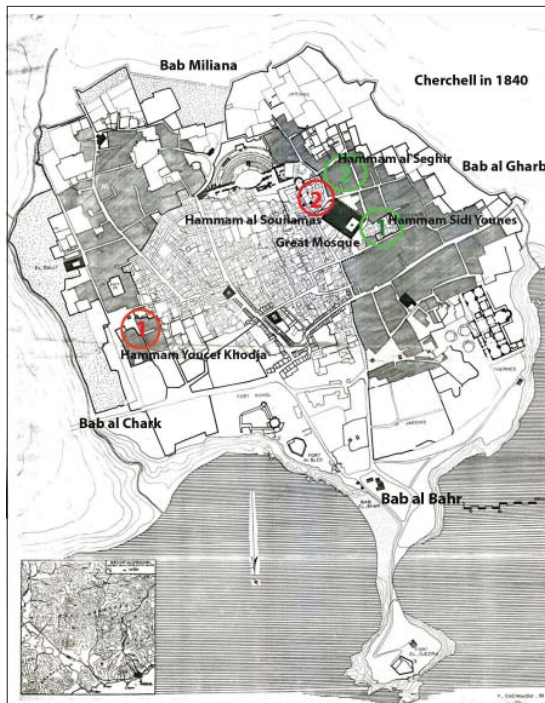


Figure 4: Hammams location in Cherchell, 1840 - drawn according to the "cadastre" (Source: Author).

### Hammam Sidi Younès

The hammam was named after the funeral mausoleum of a saint called "Sidi Younes". It is located on a small street called Aoudai St (formerly known as Palmier street), accessible



from Sidi-Brahem street (ex-la Fontaine street), which is off the main axis going down from the Gate of Miliana towards Ain Ksiba quarter.

Nowadays, and with the expansion of the urban fabric, it is harder to differentiate and appreciate the external form of the building from its immediate surroundings as they are melting increasingly on the hammam structure. It can only be noticeable through its entrance door. However, the entrance has undergone several modifications as it appears from the use of modern industrial tiles and badly cut stucco.

The entrance corridor constitutes what is called locally « the skifa». It leads to the disrobing or changing room. The client uses this room for changing clothes and to rest after bathing. The disrobing room has kept its architectural elements without any major changes. Seven massive columns topped by stone capitals define the central square space, surrounded by three elevated side galleries. The fourth side is the intermediate room. The ceiling and roof have been changed. However, from the investigation carried on the local architectural style, the study suggests that the galleries were covered by wooden truces supporting round tiles. The central square space was covered with a slightly raised wooden flag structure composed by four trusses, and based on a drum carried by the central arches of the galleries. The client then transits from this room to the intermediate room located on the fourth side of the central square. The bather stays for a while in the transit room, in order to prepare and adapt to the rising temperatures before bathing in the hot room, which also contains small private rooms for washing. These rooms are organised in a linear structure adopting a quadrangular plan. The intermediate space is

a long narrow rectangular room, called "Bin al-Bibane" (meaning in English: between doors). The hot room, in the shape of a square, is covered by an octagonal shaped (8 segments) dome supported by pendants at the corners. All along the central space of the hot room, there are side spaces (galleries) covered by barrel vaults. At each corner of the square, two arches cover the corners of the hot room, relying on the pillars supporting the central dome.

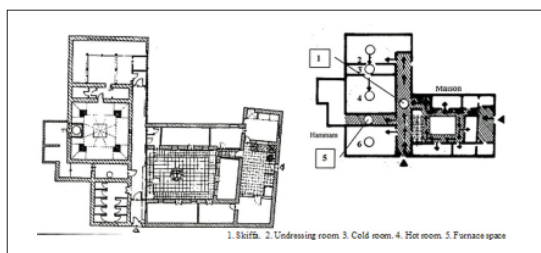


Figure 5: Floor plans Hammam Sidi Younes (Source: Author).

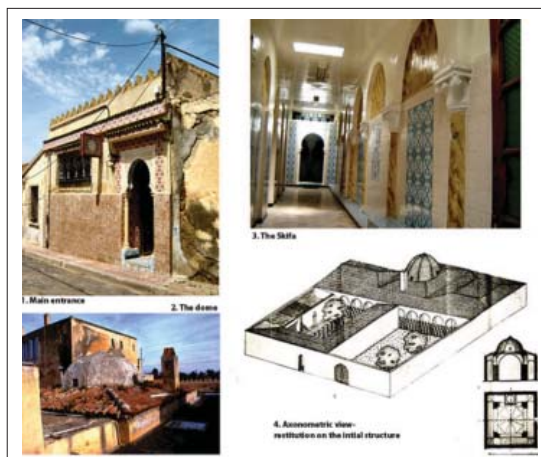


Figure 6: Hammam of Sidi Younès photographs and drawings (Source: Author).

The local construction techniques used in building the traditional hammams is another important aspect. This technique consists of covering the central space of the hot room by an octagonal segmented dome made of bricks. Hence the transition to the large spatial square of the same hot room is achieved thanks to the use of timber framed trusses covered by roof tiles. This traditional construction technique was used in some religious amenities (i.e. mausoleums) in Nasrid Granada (1232-1492) as shown in figure 7.

This characteristic of the mixed roof (brick made domes surrounded by wooden trusses supporting roof tiles) of the hammams of Cherchell is the result of the combination of local techniques and skills with the constructive innovations brought by the refugees who came from Andalusia.



Figure 7 1. View on the dome of hammam of Sidi Younès in Cherchell. (Author, 2002). 2. Ideal restitution of the Islamic heritage (Ermita de San Sebastián, 2003).

### Hammam El- Seghir

Hammam el-Seghir, means the small hammam in Arabic. It is located on the archaeological zone of the Roman city, and has two facades as it occupies an angular land plot. Thus the hammam is easily noticeable from the street. The hammam faces houses which were built on the remains of the antic thermae of the city centre. The date of its construction is not accurate. However, it can be situated as being

built in the 16th century, as for the complex it belongs to. It is part of the urban complex of the main mosque of the city centre, also called the 100 columns mosque or the great mosque, which was built by the son of the consul-judge of Granada (Spain) Abu Iyad el-Andalussi in 1573 (Figure 8). More restoration and maintenance work occurred through the Andalusian-Ottoman period (1496-1840).

The only original remain of the structure, which kept its authentic features, is the entrance door of the owner house, located at the first floor of the building. The main entrance to the hammam opens on the great mosque street, actually called "rue des frères Nadia".

The hammam has undergone changes on its structure. A vertical extension took place on the upper terrace. Small room-cells were built around the dome covering the hot room. They were built following the constructive system used in the 19th century consisting of metal beams and a vaulted floor. The same spatial organization was kept inside with the same rooms and functions. A quadrangular layout is adopted in this hammam as it is the case in Sidi-Younes bath. The transition from the reception hall- disrobing room to the hot room is done through an intermediate room, which offers a course of benched circulation (for intimacy reasons), as it is located at the northeast corner of the building. The reception hall consists of two elevated side galleries, arranged on two opposite sides. The original ceiling has disappeared. However, it is assumed that this room was covered by wooden trusses covered by curved tiles. The hot room of slightly elongated rectangular space is covered by a dome deck.

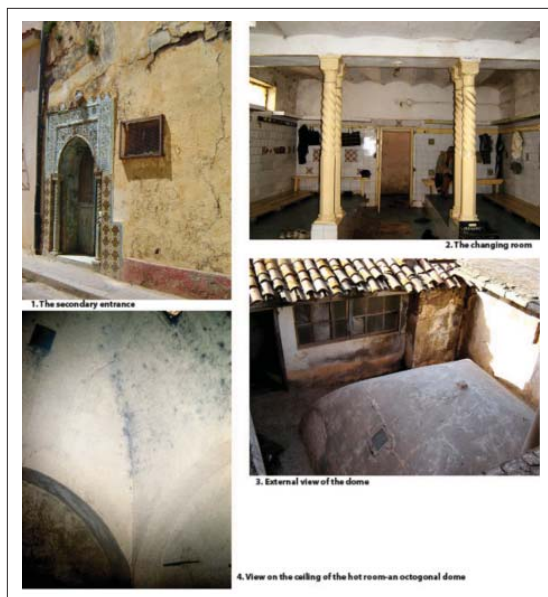


Figure 8: Photos of Hammam El-Seghir. (Source: Author).

## Private Hammams

### Hammam of Souilamas house

This private bath of the Souilamas residence became a public bath after the independence of Algeria in 1962. It is known as hammam Souilamas. Together with the large house and a public oven or furnace “koucha”, the bath was the property of a rich noble family, the Souilamas. It is located close to hammam el-Seghir. The large urban complex, composed of the large residence, the public oven and the bath, open on a straight small street, which leads towards the main mosque of Cherchell. It is suggested that the whole complex was built by the end of the 18th century, in the Andalusian-Ottoman era. It belongs to the “extra-muros”

area of the city, which was urbanized during the first extension of the medina by the end of the 17th century (figure 4).

Hammam Souilamas, a small private hammam, has been expanded by adding an extra room, which used to belong to the large residence. This extension was intended to facilitate the use of the bath by a larger number of clientele, since it became a public bathhouse. Hence more spatial changes occurred during the extension. The link between the hammam and the house is made through a small staircase externally adjacent to the hot room. Furthermore, the study confirms that the spatial link used to exist at the ground level through a corridor which has been transformed to toilets cabinet. An additional space at the entrance has been made in order to create the skifa, from which a stairwell leads to the first floor where the reception has been transformed into shower rooms. The same stairwell leads also to the intermediate and hot rooms. These two rooms are located between the first and the ground floor on a half-level, thus enabling the heat of the oven to steam through this hypocaust system. Transition between the former reception room and the hot room is through a course of bent circulation. The hot room is square, and covered by an octagonal dome with eight segments. This large residence has undergone several expansions and changes that have succeeded until the early 20th century. This had an impact on the architectural features of the monument by the introduction of new building techniques dating from the 19th century such as the use of steel structures and vaults.

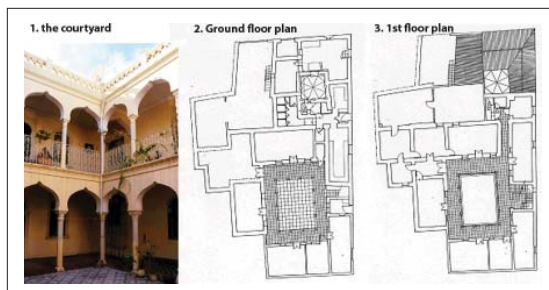


Figure 9: The Souilamas residence plans (Source: Author).

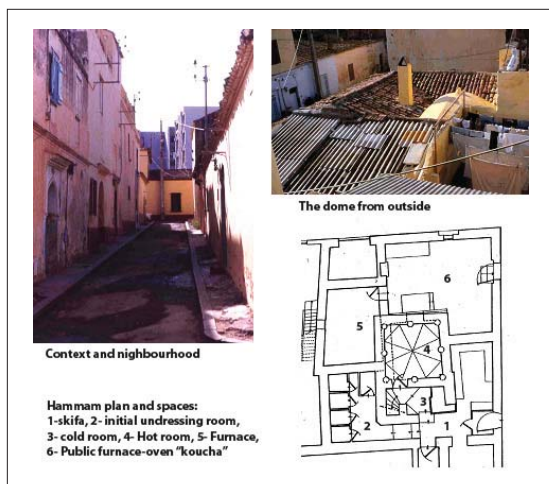


Figure10: TViews and plan of the hammam (Source: Author).

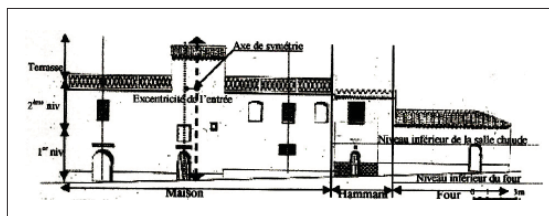


Figure 11:The analysis of height on the street façade (Source: Author).

## Hammam of Youcef Khodja house

This small private hammam built in the 17th century, and commonly known as hammam Youcef Khodja was only used by the family of Youcef Khodja and their close relatives and friends. It is part of the large house of the family, which also comprises the residence and the public bakery oven "koucha". This residence was located in the military defense area of the medina. The bath is located in the grand mosque neighbourhood. It has been used as accommodation after the expansion of the medina by the end of the 17th century. The structures of the house and the hammam disappeared in 1994, when a reconstruction project was launched.

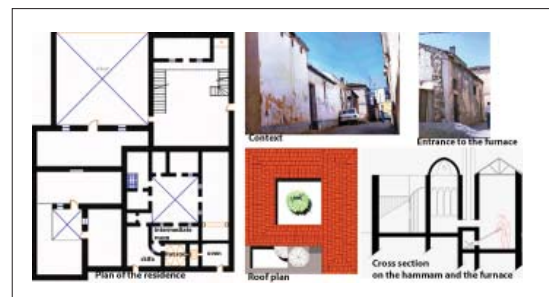


Figure 12: Photos and drawings of hammam Youcef Khodja (Source: Author).

This small private hammam was extended by converting the space of a room in the house, using it as an undressing room. Access to the hammam is directly from the courtyard. A circular space was provided at the northeast corner of the reception area, to make the intermediate room. The intermediate and hot rooms lie at the street level. However, the level of the oven was lowered by four steps, to allow the steam resulting from the oven heat



to go through a hatch cut into the chimney. This hypocaust system was used to heat the hammam. The hot room is of a square shape, covered by an octagonal brick made dome.

### Architectural Correlation Analysis: Hammam / House

The study of the typology of traditional hammams in Cherchell was conducted in order to analyze the various correlations that ranged from the public and specialized buildings with the residential domestic architecture in terms of spatial organization, proportional modulations and structural mode. The definition of such established architectural between specialized public facilities and residential buildings helped the understanding of the function and "urbanity" of the bath with the housing element, which is the basic reproducible urban entity. It is these correlations that carry the evolutionary process of the traditional architecture of Cherchell.

The concept of modularity aggregate the architectural typology of the hammam, and implies that its spaces and spatial composition are the result of a congruence of a direct linear pathway characterizing the circulation paths found in the house; skifa-court-house, with the opposite type. This latter one is based on a circular type organised around the hot room; the main space of the hammam. It is the structural analysis of the relationship between different components of the house and the hammam which tends to define them (figure 12).

The evolution of the relationship between modules of linear and aggregate spaces is configured through a sum of characters that form the architectural organization of the

hammam of Cherchell. One of the illustration of the relationship is in the notion of covering a large and high ceiling space as it is the case in the hot room, which remained dependent on the technical characteristics of the construction materials used; i.e. the materials used is the core of cedar tree, with a maximum length of 2, 40 meters.

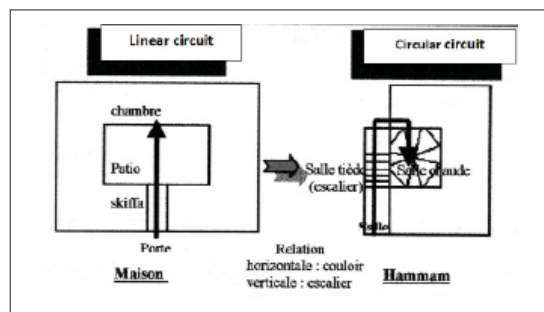


Figure 13: Linear circuit (house) versus circular circuit (hammam) (Source: Author).

This study sets as an initial hypothesis that the spatial organization of traditional hammams of Cherchell is a central spiral organization around the hot room. The dome appeared in the traditional architecture of Cherchell hammams to solve humidity and condensation caused problems. Moreover, coverage areas deeper than the 2.4 metres crossing on the usual dimensions of tree trunks, took place later on, during the French colonial period, by the introduction of another constructive semi prefabricated system French colonial period. Thus, the paper advocates that this is the same tree trunk which had been used in the implementation of the dome, as a mast pivoted to its conference to achieve its various circular bases. The 2.40 meters trunk of the cedar tree

has become the core module, giving the central area of the hot room, the relative proportions, which appeared in harmonious dimensional reports, between the masonry dome and timber roofs.

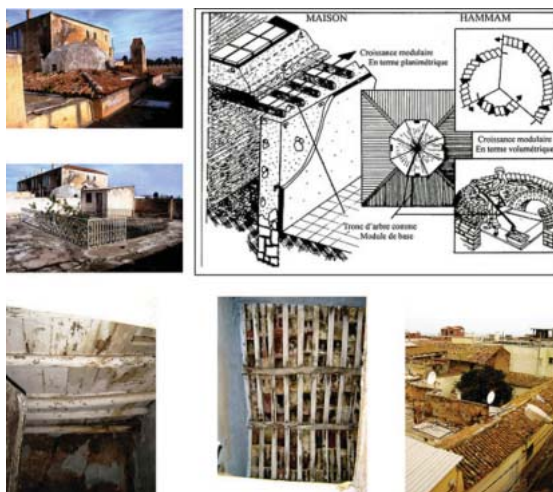


Figure 14: Technological aspects of modular growth correlation in linear space vs. aggregate space (Source: Author et al, 2001).

In addition to this first type of correlation: technological correlation; on the notion of covering the hot room central area by a dome, the study developed an investigation on the initial way of covering the reception room of hammam Sidi Younès. The area of the hot room is connoted by a maximum of nodal centrality. This type of centrality means “a consequence of a growth process that can be regular or organic in form. It embodies a convergence of a set element to a point. Thus, the intermediary aspect of the reception hall connoted here by a nodal intermediary. This has guided the use of a skylight with four different slopes from

the hot room dome, and which is no longer appropriate to exist in this case. However, the linear nature of the gallery forming the corridor of the skifa, restricted to the simple movement or articulation of space, here is connoted by an anti-nodal character -Figure. 14-(Caniggia, G and Maffei. G.L, 1987).

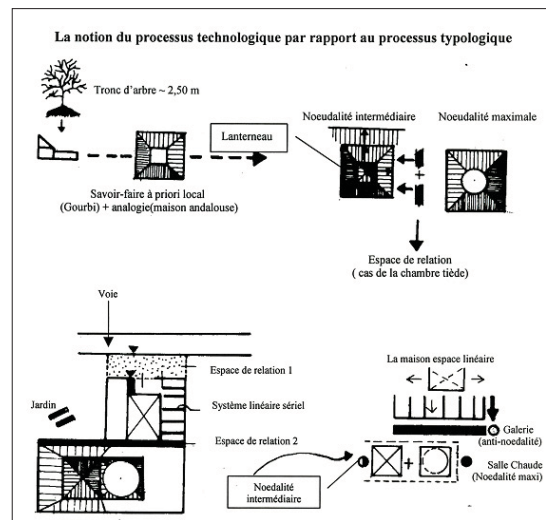


Figure 15: Spatial aspects of the modular growth correlation in linear space vs. aggregate space (Source: Author et al, 2001).

The notion of the size of the volumes in hammams and homes of Cherchell, is taking shape as appropriate, for the prevalence or not of the dome above the skyline of the roofs of the surrounding houses according to quantities and volume proportions. In the case of “public” hammams, the height of the dome is twice the height of the house floor (Hammam Sidi Younès). This double proportion in height gives the hammam an identifiable volume (dome) even though, surrounded by the houses fabric.

For the “private” hammams of large residences, the height of the dome is only half the height of a house floor (hammam Souilamas). This proportion conceals the view of the dome within the surrounding houses roofscapes (figure 15).

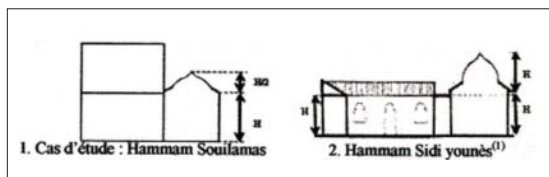


Figure 16: Comparative analysis of the height proportions hammam/house (Source: Author).

Furthermore, the modular growth of the linear space between the house and the aggregate of the hammam follows a dimensional logic, which is dependent of the construction system. The spatial module of hammam Youcef Khodja derives from the module of the spatial unit of the house. However, the depth of the reception area of the hammam equals to the half of the module. Hence, it provides equal heights for the furnace/oven and the hammam. However, the aggregate space of the hammam takes a two nesting areas around the chimney of the furnace to facilitate heating for both buildings (figure 16).

## Conclusion

The analysis developed in this study allowed defining the typologies of the traditional baths of Cherchell and their architectural and urban characteristics. Further study must understand the contexts of emergence and development of the architecture of Maghreb hammam. These studies would highlight similarities

and differences with hammams from other geographical regions. Thus, beyond the historiographical work on some historical phases of the dynasties of the Maghreb and Islamic Spain inherent to the field of theory and / or history architecture. Finally, these monuments of water, which have been perpetuated in Mediterranean culture and history, have to be preserved. In the case of Cherchell, they are important heritage buildings. Furthermore, they present ingenious technical and spatial features, which identify them with the local architectural variations, beyond the general affinities they share with the model of the Islamic hammam.

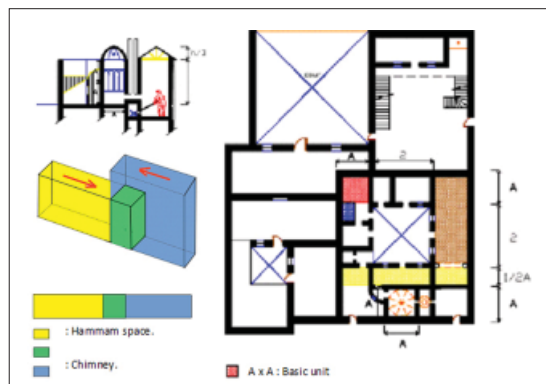


Figure 17: Spatial aspects of the modular growth correlation in linear space vs. aggregate space (Source: Author et al, 2001).

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