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Ghadames. A Continuous Urban Fabric in the pre-Saharan Habitat of the Libyan Fezzan

This article illustrates the urban fabric of Ghadames (Libya), the ancient *Cydamus* in the Roman period. This oasis-town constituted the object of study of the "Italian Architectural Mission for the Islamic Period", founded and directed from 1989 to 1995 by Paolo Cuneo, Professor at the L'Aquila University. In this type of fabric, a splendid example of the pre-Saharan habitat of the Libyan Fezzan, the traditional collective institutions of Islamic Maghreb (*jami*, *zawiya*, *marabut*) are connected by a system of public spaces (*majlis*) and covered streets, illuminated from above through light-wells, which provide a perfect climatic control in hot arid zones.

The recent work of the Mission which has been taken on by Ludovico Micara, Professor at the "G. D'Annunzio" University of Chieti-Pescara, from 1996 to 2006, faced the analysis, the study and survey of the residential fabric of Ghadames. This fabric results from the aggregation of a particular

type of house, built around a central hall (*tamanat* in the local language), that replaces the patio of the traditional houses of Islamic countries. This article aims at illustrating the complex and compact aggregation of the houses, and their relationship with public spaces, in order to create an appropriate daily framework for traditions and social roles established in the course of history.

Keywords:
house; urban fabric; hearth-architecture; conservation-transformation; Ghadames

Ghadames, the ancient *Cydamus*, located in the pre-desert of the Libyan region of Fezzan, 350 m. altitude, on the borders between Libya, Algeria and Tunisia, is one of the most interesting Saharan town-oasis of internal Libya [1] (fig. 1). It owes its ancient existence to the presence of the artesian source Ayn al-Faras [English translation from the Arabic: "mare's source"] [2] which allowed the formation of a very large oasis (about 75 hectares with 20-25,000 palm trees) [3].

It was the trans-Saharan trade that mainly determined Ghadames' fortune over the centuries, and it is the disappearance of such trade that explains its decline. The oasis of Ghadames constituted indeed an important station in the ancient caravan route between Sudan and the Mediterranean coast; important even in Roman times, if we know that *Cydamus* was occupied in the IIIrd century by a *vexillatio* of the *Legio III Augusta* and that it was held, with alternating events, under the dominion of the empire until the disintegration of the Libyan military garrisons of Emperor Justinian. The oasis was occupied in year 47 of the Hegira (667 AD) by the Arabs led by Sidi Uqba Ibn Nafi, the famous general leader of the first Muslim conquest of the Maghreb. Sidi Uqba is remembered, in the cemetery in the South part of the city, by the homonymous *musalla* (open place of prayer) which occupies the site of the leader's original memorial.

Important evidence of this most ancient historical phase of Ghadames is, in its western suburb, the so-called plain of the "idols", el Asnam, in Arabic, or *temsammudin* (places of prayer), in Berber, late Roman funerary monuments now in ruins, probably belonging to Berber princely dynasties, passed under the Roman protectorate [4] in the 3rd century AD.

A comparison with the contemporary monumental tombs of Ghirza (4th century AD) allows to reconstruct the original form of these remains, and, at the same time, to interpret the large amount of architectural pieces as *spolia*. These are scattered in the most significant points of *majlis* or public spaces, as well as inside religious buildings and *hammam* of Ghadames [5]. A tomb of this type, also in the plain of the "idols", was the supposed minaret of a small mosque now in ruins, Yunus

al-Qadim, which is perhaps the oldest Islamic monument of the city (fig. 2).

The work of the "Italian Architectural Mission for the Islamic Period in Libya" [6] mainly addressed, from 1989 to 1995 - the year of the sudden disappearance of its first director, Professor Paolo Cuneo [7] - the identification and definition of the urban structure of Ghadames. Its historical genesis is characterized by the synoecism of two human groups of Berber origin, the Banu Walid and the Banu Wazit.

Such a synoecism has led over time to the transition from a habitat characterized by the presence of numerous *qsur* [8] within the oasis, to the formation of a dual structure of the urban center, which is frequent in the Islamic world, even in the Mediterranean area.

The urban center, organized in different districts (fig. 3) - Maziq, Darar and Tisku, inhabited by the Banu Walid; Tangzin, Tafarfara and Jarasan, inhabited by the Banu Wazit; Awlad Bellil, inhabited by Arabic ethnic groups of the same name -, is structured around the central nucleus. This is characterized by a square (*majlis*), enclosed between the two white large mosques, the ancient Jami al-Atiq of the Banu Walid and Jami Yunus of the Banu Wazit.

On this central *majlis*, (fig. 4) (fig. 5) (fig. 6) equipped with simple masonry seats, the main covered paths converge; these organize the districts of the city inhabited by the two different ethnic groups. In the same square, located near the Ain al-Faras water basin, the main public functions were held, including the market, the entrance to the mosques, and the control of the water supply directed towards the various canals, in order to feed, after the mosques, the houses and the irrigation canals of the oasis.

The latter function is very important for the survival of the oasis gardens due to the scarcity of the water resource; it was carried out in a niche on the wall of the Yunus Mosque, where it was possible to control the flow of the main canal. A special appointee (the assignment was transmitted from father to son), who exchanged with two other people within 24 hours, filled the unit of measurement,



Fig. 1 - Ghadames: satellite view of the oasis-town. (DigitalGLOBE, 2005).



Fig. 2 - Ghadames: view of the Yunus al-Qadim. What appears today as the minaret of the ancient mosque was probably one *asnam* of the plain of "idols" (Picture by the author, 2003).

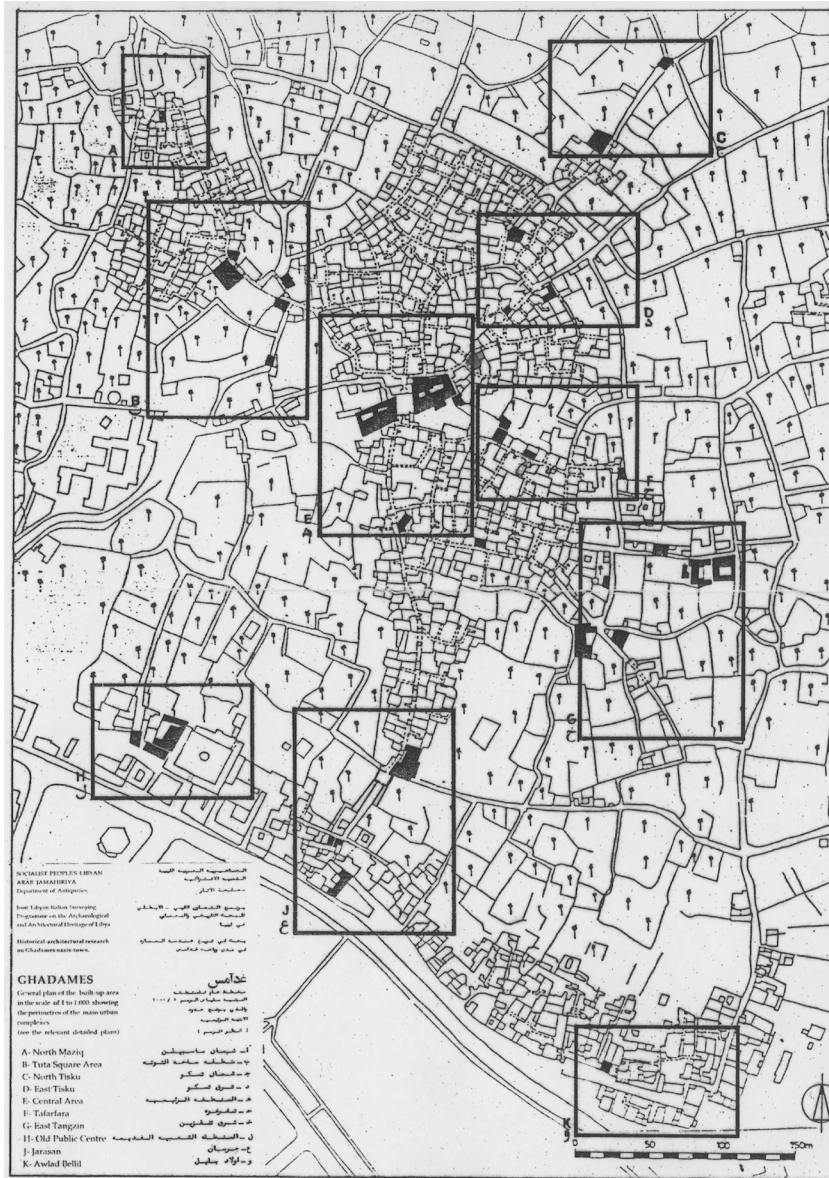


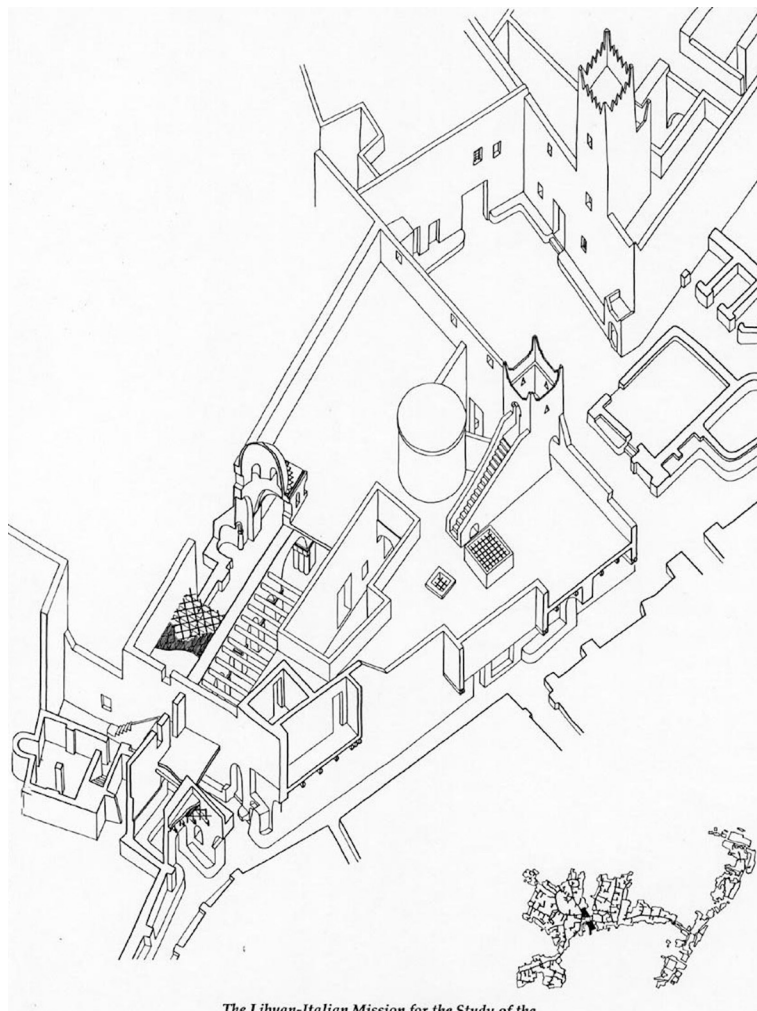
Fig. 3 - Ghadames: general plan of the built-up area showing the perimeters of the urban districts. (Italian Architectural Mission for the Islamic Period in Libya, 1995).



Fig. 4 - Ghadames: view of the Tisku square. (Picture by the author, 2004).

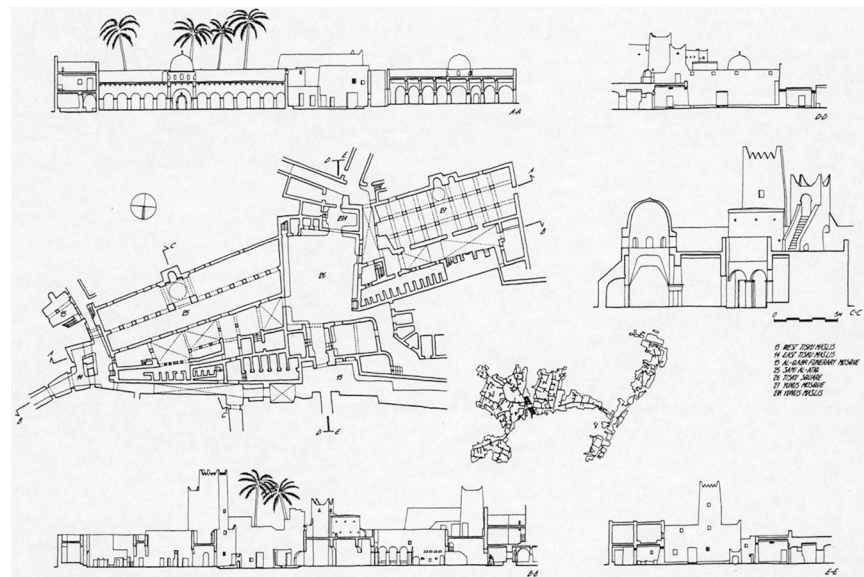
the *gaddush*, consisting of a copper vase with a small hole at the bottom. Every time the *gaddush* emptied and was subsequently filled (every three minutes), the attendant made a small knot on a palm filament, so that he could count the number of *gaddush* in the 24 hours. A controller warned that the time of water to which a certain garden was entitled had elapsed; its cry allowed the owner of the next garden to modify the course of the water along the canals in order to quickly direct it to his lands [9].

Within such clear and recognizable urban fabric, it is then possible to identify thirteen neighborhoods, articulated around architectural complexes, including religious buildings, public spaces, meeting places and markets. And finally it was possible, as well, to study eighty-five buildings, belonging to the different monumental typologies of the traditional Islamic city with significant variations of the pre-Saharan regions, namely, the large congregational mosques (*jamī*), the district mosques, the buildings of the brotherhoods (*zawiya*), the public spaces (*majlis*) (fig. 7) (fig. 9) preferably located next to the mosques, the souk and markets (fig. 8), the tombs of the saints (*marabut*), the urban gates (*bab*), the cemeteries, etc. The architecture of the major mosques is particularly suggestive, being characterized by a frequent



The Libyan-Italian Mission for the Study of the

Fig. 5 - Ghadames: axonometric view of the central area. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author)



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GHADAMES: Central Area

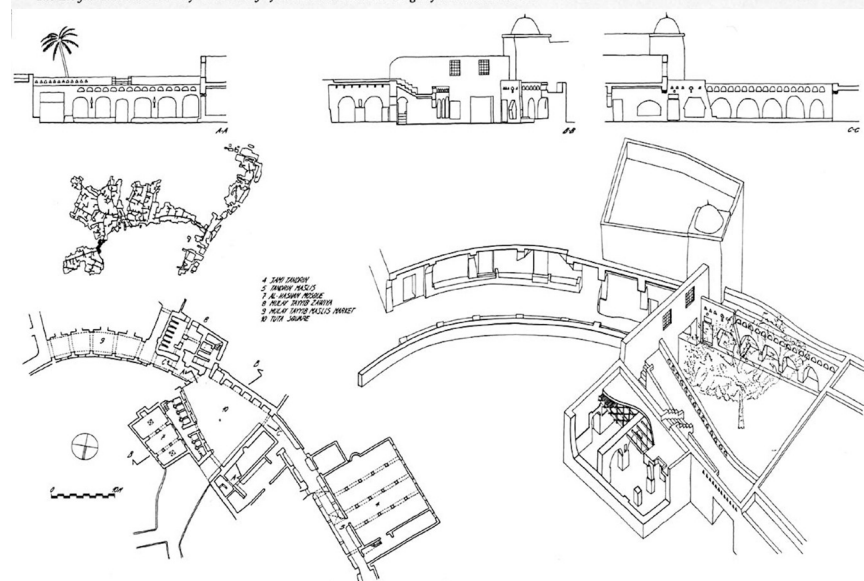


Fig. 6 - Ghadames: plan and elevations of the central area, with the two main mosques. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author)

Fig. 7 - Ghadames: the complex of Al Tuta Square with Jami Tandrin (4), Tandrin Majlis (5), Al Hasan Jami (7), Mula Tayyb Zawiya (8), Mula Tayyb Market (9), Al Tuta Square (10). (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author)

typology in Fezzan, defined by a few naves, two in the Jami al-Atiq and three in the Yunus Jami, which are parallel to the wall of the *qibla*. Thus, the mosque mainly grew in a longitudinal direction, with respectively thirteen and nine spans, where the central one, wider than the others, prospects the *qibla* (fig. 10).

The roofs are very simple: flat, in palm wood in the Jami al-Atiq, and low-vaulted, supported by arches, in the Yunus, while the dome is only reserved for the space in front of the *qibla*. The shape of the pillars supporting the arches of the naves' walls is very interesting. The pillars generally incorporate stone columns and capitals, deriving, as *spolia*, from the ancient Asnam.

The columns, coupled or joined to four, form solid and articulated piers. The very simplified capitals, with decorations based mostly on triangular patterns, define the elegant design of the node, thinner than the support, between the pillar and the heavy structure of the arches.

The shape of the arch is often defined, especially in the smaller mosques, by the form that its ribs, made out of palm branches, assume when bended. The warm colors of the palm fiber mats, which protect the soil and the base of the pillars, soften, in the penumbra, the whiteness which uniformly cov-

ers the interior and exterior of the sacred buildings. However, alongside a research that led to the study of the urban structure and architecture of major buildings and collective spaces, a fundamental aspect, among others, still remains to be clarified, which concerns the shape of the urban fabric. This shape - perhaps the most striking for the visitor - due to the big difference with the western city - is the constant background, a compact fabric, with few and discreet variations, inside which the recognizable individualities of the buildings for the collective institutions are inserted. This background is also the most apparent in the urban experience of Ghadames and other town-oasis of Maghreb.

Solids and voids, houses and streets, are part of a single continuous and homogeneous material, in which void spaces have been "excavated", and where light penetrates from above in a selective manner. The expression "entering the city" is not metaphorical but concrete, as one enters in a sequence of covered interior spaces. The term *continuum* has never been so appropriate, as it perfectly depicts the physical and material continuity of the traditional city.

When, in 1996, I had the responsibility of the Mission's direction, it was immediately clear to me

that, to complete Paolo Cuneo's work on Ghadames, it was necessary to elaborate on the issues just outlined. The study of such a fabric [10], which has the advantage of ensuring perfect control of environmental well-being in often extreme climatic situations, required to develop a particular operational strategy.

Indeed, it was not so important to know the structure of single houses as much as to study a group of contiguous houses, straddling the main road, in order to understand that vertical interweaving of residential and path spaces that allows the creation of a system, so typical of Ghadames, of covered streets, lit by light-wells from above (fig. 11, fig. 12). Such a strategy required to physically access these groups of houses, and to know their owners, not an easy task in a settlement largely abandoned today [11], in order to properly survey and study those internal spaces.

It was possible to overcome such difficulties only thanks to the collaboration of the people of the chosen district, Jarasan, inhabited by the Banu Wazit, and the help of some officials of the Libyan Department of Antiquities [12]. It was thus possible to find twenty-three not isolated houses, being part of contiguous clusters, as a significant sample of the complex residential fabric of the city (fig. 13).



Fig. 8 - Ghadames: view of the Mulay Tayyib Market. (Picture by the author, 2004).

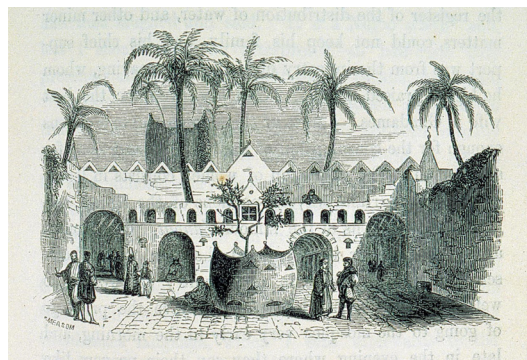


Fig. 9 - Ghadames: view of Al Tuta Square or Mulberry Square. From Richardson J. (1848). Vol. 1, p. 225. (Author's interpretation).



Fig. 10 - Ghadames, Yunus Mosque, view of the naves parallel to *qibla*. (Picture by the author, 2003).

The survey of the houses reveals that the method commonly adopted to create an urban fabric with covered streets, which offers shelter from the extreme summer heat as well as from the winter cold, is the constant measurement of the streets width (2.5-3 m.), a module also suitable to build a room, or an extension of the central hall over the passage (fig. 14). The houses in Ghadames grow vertically, according to a recurrent and recognizable organization, which identifies a well-established residential type. In this type, we can recognize three main levels, connected by stairs, corresponding to three functional, spatial and symbolical sections of the house (fig. 15). The ground level contains an entrance (*ajard* in the local language) and a store room besides a cesspit, located under the bathroom, where the dung used to fertilize the oasis is collected. A first flight of stairs (*slunen*), after an intermediate level that allows the entrance into a small bathroom (*tajammil*), leads to the main space of the house, the *tamanat*.

This cube-shaped central hall is higher (4-5 m.) than the other spaces of the house and is surrounded, at different levels, by minor rooms. At the entrance corner of the *tamanat*, two other stairs rise along two contiguous walls. One of these staircases reaches, after a few steps, the bedroom used during the intermedium seasons (*tali ni sarir*), while the second one climbs to another bedroom (*tali ni sluna*, the room of the stairs) and ends at the terrace. A winter bedroom (*tali ni tamanat*) and a small room called *qubba* are located along the third wall of the *tamanat*.

The *qubba*, that communicates with the *tamanat* through an arch, is the symbolic and ritual nucleus of the house, as the major events of the domestic life, such as birth, marriage and death, take place there. The present decline of the Ghadames' housing type is revealed by the transformation of the *qubba*, the guardian of the true values of the family life, into a merely functional space. The fourth wall (*adon sciubbaq*) of the *tamanat* is decorated with stucco reliefs following geometrical motifs similar to those commonly used for niches, shelves and other built-in furniture.

The *tamanat*, being surrounded by the above



Fig. 11 - Ghadames, plan of the covered streets (in black). The small white squares are the light-wells that light special points of the streets, crossings, entrances of important houses, etc. (UNCHS - Habitat Survey Nov. 1987 U.M.)

rooms, is illuminated only from above through a square skylight (*tanavot*), opened on the terrace roof and protected by an iron grating. Perpetually immersed in a cool and shady atmosphere, the

tamanat is the representative and functional core of the house (fig. 16). It is the covered version of the courtyard of the traditional houses of the Islamic countries, playing the same central role in

the organization of the building type (fig. 17). On the terrace of the house, a kitchen (*ajurer*) and a minor service room can be found. This level of the house is reserved to women, who can reach the contiguous houses through passages opened in the surrounding walls of the terrace. Thus, a continuous system of paths is created at terrace level (fig. 18), mainly used by women: a system which is parallel and complementary to the ground level one, mostly used by men [13]. Particular attention has been devoted to the analysis of the residential typology, regardless of the architectural quality of each building. The repetition of this type in the whole city created a unique urban fabric. A specific type of urban house has been identified, which differs from the suburban ones as well as from those in other settlements of the Pre-Saharan region [14]. The originality of this type not only derives from an autochthonous residential culture, or from specific building technologies existing in other geographical contexts, but it comes also from the particular history of the settlement in Ghadames.

It is possible to find in the borders and neighborhoods of the oasis, as in the village of Tunin, examples of a residential type quite similar to that already described in Ghadames, though with a

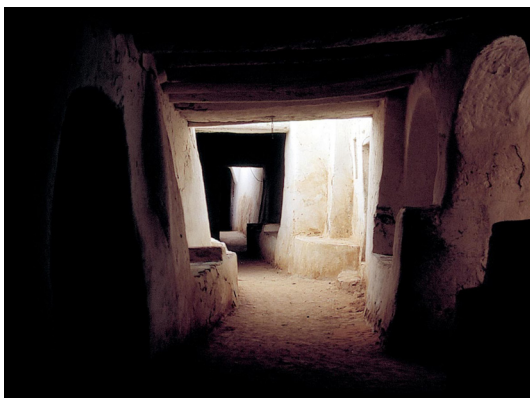


Fig. 12 - Ghadames view of a covered street lit by light-wells. (Picture by the author, 2004)

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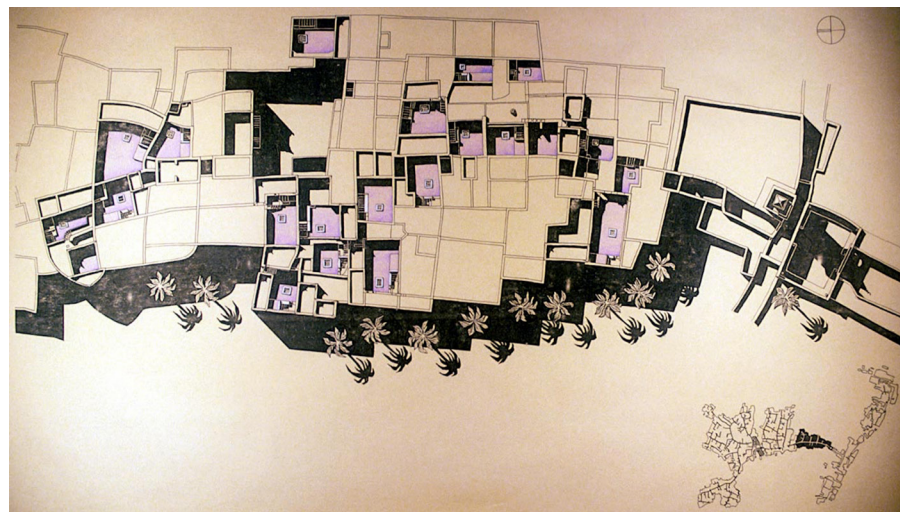


Fig. 13 - Ghadames, layout of the Jarasan quarter. The violet squares are the terraces of the surveyed houses; the streets are not visible, since they are covered by the houses. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author).

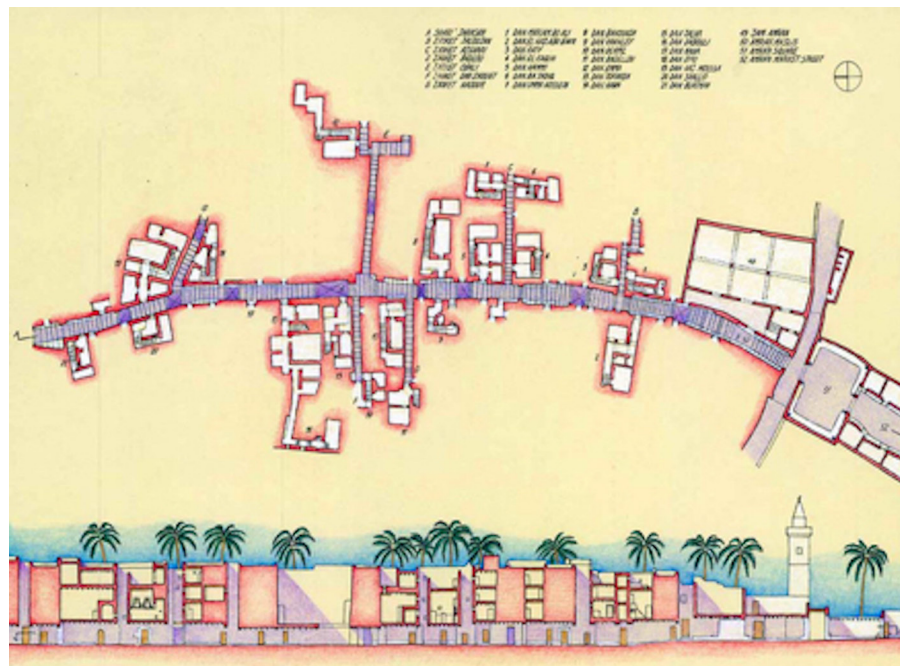


Fig. 14 - Ghadames ground-floor plan and section of the Jarasan street. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author).

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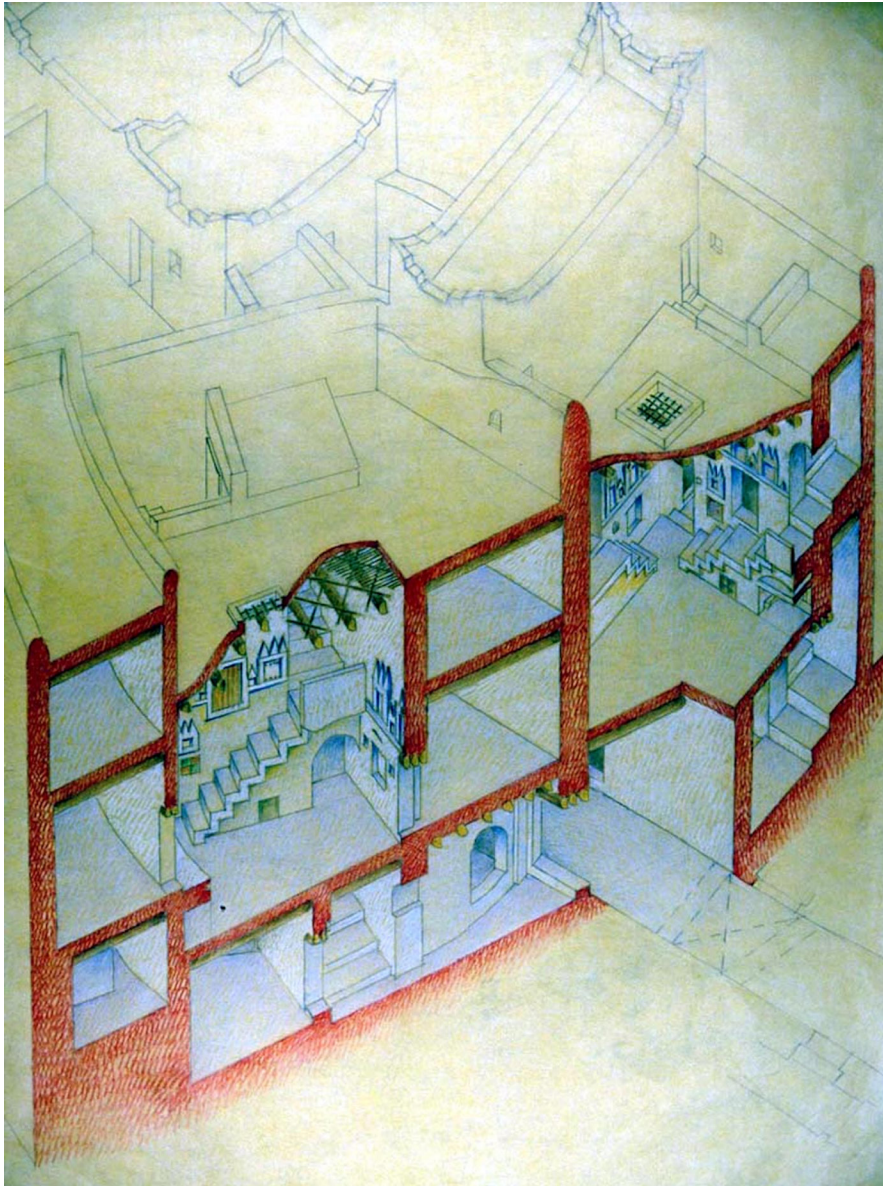


Fig. 15 - Ghadames, axonometric view of a group of two houses covering the street. The central higher room is the *tamanat*. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author).

fundamental difference. Such a residential type, spread out in the oasis, is organized at two levels instead of three. Actually, the *tamanat* is located at ground level, and not above the entrance level, as in the medina of Ghadames. However, the relation between the *tamanat* and the upper terrace does not change. The two-floor type does not allow the systematic overlaying of the rooms above the street, and it is more suitable for extensive settlements. Thus, we can speculate that this two-level type of settlement was not adopted in the center of the town-oasis to avoid covering the whole area of the oasis due to the increasing number of buildings. The result was the creation of a highly intensive central area, obtained through raising up the main level of the house in order to cover the street, and leaving the ground floor for services and storage of goods, thus responding to the needs of a growing caravan traffic. The use of this intensive house-type allowed to safeguard the ecology of the oasis, leaving a great part of lands to cultivate palm gardens and orchards [15].

Certain topics, however, need to be explored more in depth, in order to understand all aspects of the complex spatial system of Ghadames. Among these aspects, the deciphering of the decorative and symbolic heritage of the Ghadames architecture. In the urban skyline, this heritage is revealed by the pointed triangular elements, *serafin*, that



Fig. 16 - Ghadames, view of an old *tamanat*. (Picture by the author, 2013).

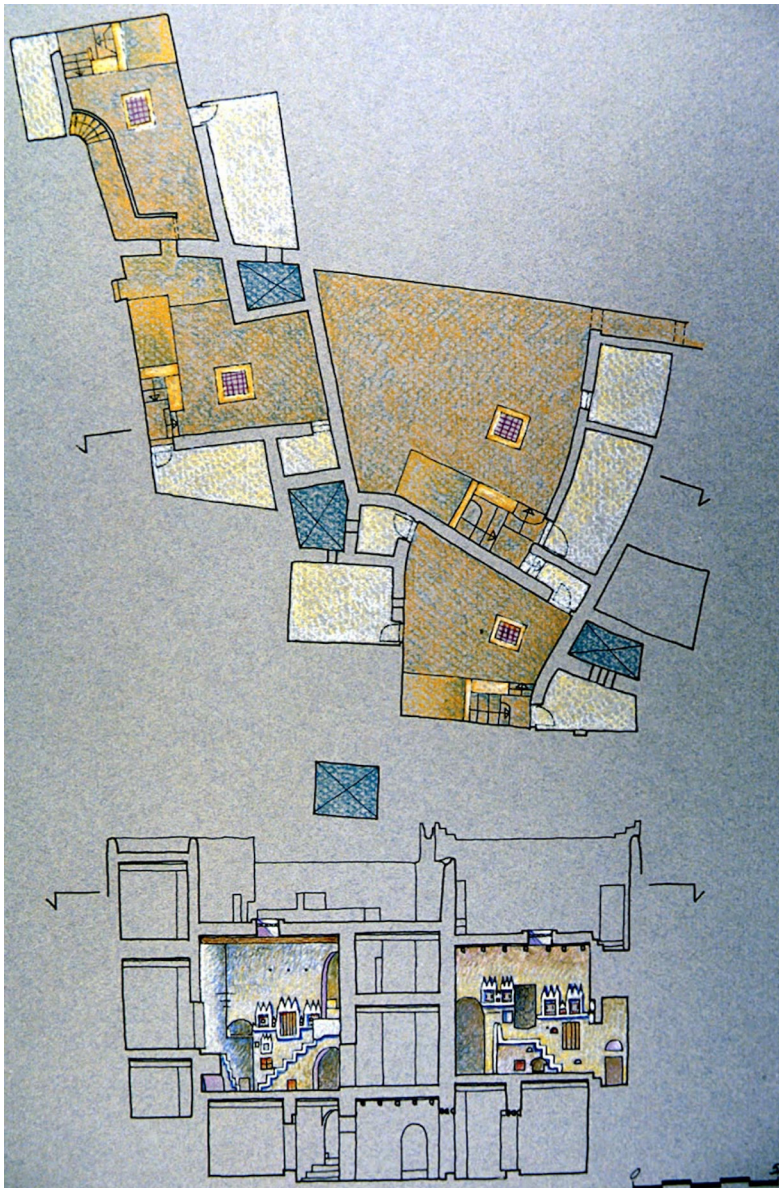


Fig. 17 - Ghadames, roof plan and section of two houses covering a street. The green squares on the roof plan are the light-wells, lighting the street on the ground floor. (The Libyan-Italian Mission for the Study of the Architectural Heritage of the Islamic Period. Drawing by the author).

top the corners of the buildings, which were presumed to magically keep demons and evils away from the house (fig. 19).

But such a decorative heritage [16] reaches its communicative apex in the house, particularly in the *tamanat* where, in its quiet and shadowy atmosphere, abstract, white or colored decorative motifs appear on the wall. The triangular, very pointed and almost conical shapes, repeated three times, surmount a thick frame that includes a square finely pierced by more subtle decorative textures. These motifs often appear alone, framing the wooden door of a small closet or underlining the presence of a shelf while, in other cases, they follow one another in linear bands, along the walls (fig. 20).

Their continuous and insistent presence testifies to a communicative urgency, a need for expression, about which, at the current stage of research, it is only possible to make hypotheses. If we think that the internal space of the *tamanat*, being entirely surrounded by rooms or other houses, has no relationship with the outside, except through the square skylight in the ceiling, it is, maybe, possible to interpret those decorations like windows, or a desire for windows, through which you can get in touch with the landscapes of an outer world, other than the desert. Through



Fig. 18 - Ghadames, view of a path for women on the terraces. (Picture by the author, 2005)



Fig. 19 - Ghadames, the skyline of the *serafin* in the corners of the buildings' terraces. (Picture by the author, 2004).

these virtual windows, bright images will penetrate into the perennial penumbra of the large interior space, and metaphorically evoke the richness and complexity of an imaginary nature through the only possible form allowed by religion and customs, that is, an abstract form [17].

CONCLUSIONS

The knowledge of Ghadames' residential fabric suggests a specific conservation and restoration method. To this end, it is necessary to avoid producing missing parts or empty spaces in an urban fabric whose distinctive feature is physical and structural continuity (fig. 21). The presence of collapsed or demolished houses immediately produces the ruin of the neighboring ones. Actually, in an easily perishable building system, that uses sun-dried mud bricks for vertical structures and palm wood for the horizontal ones, a void produced by a missing house exposes the unprotected walls of the adjacent ones to the inclemency of the weather. In addition, this destroys the structural and mutual connection that is a prominent feature of the continuous building fabric.

In this situation, worsened by the increasing number of abandoned houses, the restoration of the fabric becomes particularly urgent in order to preserve an extraordinary settlement from decay.

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Fig. 20 - Ghadames, relief decorations in the *tamanaf's* wall. (Picture by the author, 2004).

Since the people of Ghadames are still the owners of the houses, although they do not live anymore in the medina, they should be the main actors of the restoration. They need to be supported by technicians in order to apply suitable building methods and materials to adequately restore their properties, and safeguard the cultural value of their houses, beyond the economic one [18].



Fig. 21 - Ghadames' skyline, with, in the foreground, the mosques Al-Atiq and Yunus, and, in the background, the palm oasis. (Picture by the author, 2004).

NOTE

[1] Ibn Khaldun (1852-1856). Leone Africano (1896-98). Pervinquièrè L. (1912). Lafi N. (2006). Kraiss J. (2019). Scarin E. (1940).

[2] So-called, based on the legend that tells how the mare of the conqueror Sidi Uqba, exhausted by the heat and thirsty, arrived there and, beating the ground with her paws, miraculously gave rise to an abundant pool of water.

[3] Guida d'Italia del Touring Club Italiano. Possedimenti e colonie. (1929).

[4] Rebuffat R. (1994). Richardson J. (1848).

[5] A research on this topic is currently being carried out by Dr. Beatrice Pinna Caboni, archaeologist, particularly focused on the restoration of the original appearance of these monuments, *asnam*, based on the study and virtual relocation of the numerous remains, *spolia*, reused in the buildings of the city.

[6] The Mission, created in 1989 by the Department of Libyan Antiquities in agreement with the Italian Ministry of Foreign Affairs, is part of a body of studies and interests, concerning architecture and the Arab-Islamic city, which characterized the research of its first director, Paolo Cuneo, then Professor at the L'Aquila University, and author of *Storia dell'urbanistica. Il mondo islamico* (Eng: *History of Urban planning. The Islamic world*, published in 1986 by Laterza. Since 1996, the Mission, which had the oasis-city of Ghadames and the Medina of Tripoli as its main research fields, has been directed by Ludovico Micara, Professor at the "G. D'Annunzio" University, IDEA

Department, Chieti-Pescara (Italy).

[7] Cuneo P. (1995). Cuneo P., Abdelhadi K., Barucco P., Benedetti E., Pinna Caboni B. (1996).

[8] Plural form of the term *qsar*, Maghrebi Arabic variant of *qasr* (castle), which, in the Maghreb area, means "fortified village".

[9] Ufficio delle Opere Pubbliche della Tripolitania (1928).

[10] Micara L. (1998). Micara L. (1999). Micara L. (2003).

[11] The inhabitants have moved into a new village, built by Gheddafi's government, in the suburb of Ghadames.

[12] Dr. Juma Garsa al-Sifawi of the Tripoli Department of Antiquities, Dr. Abdelmane Mabid Almadne and Dr. Mansur Abdessalam Mohamed of the Historic Museum of Ghadames.

[13] "... the respectable women of Ghadames, white or coloured, never descend to the street, nor even go into the gardens around their houses. Their flat-roofed house is their eternal promenade, and their whole world is comprehended within two or three miserable rooms. The date-palms they see, and a few glimpses of the Desert beyond – and this is all. Truly it is necessary to establish an Anti-Slavery Society for the women of this oasis". In Richardson J. (1848). Vol. 1, p. 225.

[14] As the Moroccan *qasba* or the *qsar* of the Algerian oases.

[15] "The oasis today is much smaller than in the past, because just 75-80 hectares of land are irrigated while the 22.000 palms

of twenty years ago are today reduced to 13.000". In Ufficio delle Opere Pubbliche della Tripolitania (1928), op.cit.

[16] About the oasis-town of Ghat, James Richardson said: "The style of architecture, both here and in Ghadames, is the same, except that of Ghadames is neater and more fantastically elaborated. Most of the walls are surmounted with a mud-plaster work, and the tops and terraces of the houses are surmounted with the same style of material, and generally very irregularly done ... The cupboards cut out or excavated in the walls are of the shape of squares or triangles, and the windows sometimes of the same shape, but occasionally varying ...". In Richardson J. (1848), op. cit., II, (pp. 70-71).

[17] About the decorative and symbolic heritage of the architecture of Ghadames, see El Zanni, H. (2015) pp. 125-172.

[18] I would like to thank Juma Garsa al-Sifawi of the Libyan Department of Antiquities; Abdelmane Mabid Almadne and Mansur Abdessalam Mohamed of the Archaeological Museum of Ghadames, and Abouzied Abdel Kader, the representative of the Jaranas quarter, where the surveys of the houses have been carried out. I thank, as well, Melanie Mauch and Fabrizio Arrigoni, who converted rough sketches and surveys into nice drawings.

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