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Endnotes

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1. Respectively from north to south these rivers consist of: Ourika River, Sebou River which has a lot of tributaries and passes near the cities of Fez and Marrakesh, and irrigate some of the most fertile regions in Morocco (Munes, 2013:18).

2. The municipal council, RADEEF, and ADER-Fès are the main actors in the improvement of water and sewage systems. ADER-Fès has restored more than seven kilometers of traditional water channels under the ground of the medina. These channels are among the most advanced historic water distribution systems in Morocco, and date back to the 10th century. The restoration project was also included the public fountains and Saqayehs.

3. The tanneries in the city of Fez are located in the thalweg areas and the lower lands of the city, where the water simply flows, and also near the main river.

4. Fez is positioned near the anonymous amount of springs which provide the water of the river... this abundance of water provided the basic for the urban development... on the other hand, the sanitary of the city depended to this water. Furthermore, this amount of water made it possible to build watermills in some part of the city (Mounes, 2013: 385).

5. In Bukhara, although the presence of water among the city was happened through the small or big Hauzes with the same formal instruction, but the decorative and formal consideration in these elements is really less than what we face in Morocco. In other example in Semnan despite the advances in the social aspect of water infrastructure, the pools which serve as a water reservoirs don't follow any formal instructions and appear in organic way behind the gate of each neighborhood (Fig.13).

Before the establishment of Fez, the cities in the Islamic era in Morocco were nothing but the small military- 6. religious kasbahs. The formation of the city in Morocco was taken place during the era of Idris, the one who first reconstructed and expanded the Roman city of Volubilis, and then in the 9th century established Fez. The other famous cities in Morocco including the city of Marrakesh were founded during the almoravid era, and after that respectively, the cities were built along the coast, among the wadis and beside the commercial roads (tsugitaka, 2009:114).

7. In Morocco before Muslims conquest in the 7th century, Romans and after them the Byzantines were dominant. These people were gathered in the coastal field and mixed with the Indigenous people. Before them the Greeks did the same. One of the remnants from the Roman Empire in the Morocco is the ruins of Volubilis. A city which was founded in the 3rd century B.C during the Mauritania era and was the capital of the empire until the 4th B.C. with the attachment of Mauritania to Rome, Volubilis became one of the most important cities in the Roman Empire, developed and many of public and private buildings, utilities, about 8 gates and the fortifications were founded. When the Romans left the north Africa in 285 A.C the dark age of Volubilis was commenced, until the era of Idriss the first (ASOV,1997). In 789 A.C Volubilis became the first capital of Idriss I.

and public service ensembles. They integrated with sacred and religious functions in the city. In some cases, the water itself acts as a sacred element. The presence of water infrastructure with the saqayehs was happened in the public spaces, under the sabaths, the junctions of the alleys, open spaces, and in front of the city gates, or bazaars. This last element of the

water infrastructure is emerging with the same decoration in the public and private spaces. Repeated with the unique aesthetical approach, the saqayehs emerge in the familiar common sacred form and decoration. In the main squares appear with more condensed decoration.

Conclusion

This paper shows that the water infrastructure in the Moroccan cities has played more than the mere physical functional role in these cities. A multifaceted role which has come from the multi-aspect value of the water in their culture. Since 'Najm al-Din Bemaat' has indicated that water in either physical and non-physical element for these people (in his writing about Fez and its Muslim residents). Due to this value of water, the water infrastructure acts as a landscape infrastructure in these cities. The infrastructure which has transformed from the mere physical water network to the infrastructure with the pivotal role in the urban landscape of the Moroccan cities. The water network and its role in the urban structures and its emergence in the urban spaces have made this component to the simultaneously social and individual, natural and symbolic, cultural and geographical elements. This water infrastructure, specifically its latest element (the saqayeh) acts as a mediator between objectivity and subjectivity in the Moroccan cities and makes it possible reading these cities both physically and mentally. If we accept to call the phenomenon in the same time subjective and objective the landscape phenomenon; a phenomenon which has multi aspects: both functionally and aesthetically, ritual and natural,

and geographical and symbolic. The water infrastructures in Moroccan cities are definitely should be considered as an example of this kind of phenomenon.

The infrastructure that its aesthetic aspects and its unique formal emergence, have transformed it to the most significant element in the urban landscape of these cities, and their fundamental role in the formation of the cities and their residential and public fabrics is considerable. The unique formal language of saqayehs (where the water comes out of a decorative niche on the wall) as the last ring in the chain of the water network in Moroccan cities is the continuation of the Roman tradition which was common in the Roman cities in this region before Islam (specifically in the ruins of the Roman city of Volubilis near Fez). The combination of this Roman traditional formal approach with the religious decoration of mihrabs in the Moroccan mosques and madrasas is remarkable. This formal language which reveals the respect the water in combination with the sacred mihrab form, has shaped the unique aesthetic for the saqayehs in the Moroccan cities, and its repetition of this form related to the saqayehs in both public and private spaces, has made these elements as landscape elements in these cities.

Today, the ruins of the covered canals are still visible among the city. Visiting the ruins of the Volubilis reveals the origin of the saqayehs and their special form carved like niche on the wall in the Moroccan cities: The Triumphal Arch of Caracalla, which led to the main street of the city is one of the rare remain gates in the city, all the walls around this gate were destroyed, but the gate with its significant arch still catches the eyes. In the body of the gate in two sides of the main arch, which act as a passage, two niches with a pediment above them are carved on the wall of the gate, a little rectangular basin is located under each niche, and the trace of a hole is still visible on the wall of each niche which prove that water was poured from the engraved niches beside the main arch to the basins, just like the saqayehs in Moroccan cities.

A review on the ruins of other Roman cities all around the Roman Empire territory shows the same instruction in the public emergence of the water among the city with engraved fountain niches on the public walls or on the city gates (Fig.13).

Saqayeh: the repetition of sacred form in the

urban landscape of Morocco

Water in Morocco as the Islamic country has always been respected. Water was not only a functional element for Moroccan people, but also a subjective element with a conceptual meaning. Due to this subjective consideration, the water became a symbolic element for purity and eradicating impurities. Therefore, this symbolic element gains the significant attention and emergence along with considerable amounts of decoration in the city. Water is framed in a Moroccan arch with the most condensed qashani. This unique ornamental decoration is repeated in the saqayehs all around the city and sometimes with more sumptuous decoration in the individual residences. This niche form with the Moroccan arch and decorative ornaments is similar to the one we found in the mihrabs in Moroccan mosques and madrassas.

What we gathered in this paper shows that the water infrastructure in Moroccan cities plays a multifaceted role in the urban structure:

These networks are totally in accordance with the topographical and natural features of the context which shaped the neighbourhood centers



Fig.13. two water fountains in the form of niches on the wall of the Triumph Gate in the Roman city of Volubilis.
Photo: Ayda Alehashemi, 2016.

in the city which we are not familiar in the Iranian examples even in the most developed examples in Bukhara⁵.

Looking for the roots of the presence of saqayehs in the Moroccan cities

The question about the unique formal way the saqayehs appear among the Moroccan cities (framed niche carved on the wall), is the question came to the mind from the very first contact with the Moroccan cities, and the repetition of this instruction makes this question even more serious.

Fez, as the first example of the Islamic cities in Morocco⁶ can be a template for other cities in the next centuries. A city which was established by Idris I (or Idris Ibn Abdullah), the one who first stayed in the Roman city Volubilis. The life of Idris I in Volubilis as his role in the reconstruction and expansion of this city before he had transited his

capital to the new city of Fez, makes the influence of the roman urban culture in the construction of Fez more acceptable⁷. Today, the ruins of Volubilis which are less than half of the city in its heydays, on a shallow slope below the Zerhoun mountain between two cities of Fes and Meknes, present one of the most significant examples of the developed Roman water infrastructure: the water conveys to the city through the aqueduct, the aqueduct was demolished in a time of the Romans left the Africa in 285 A.D and made the residences leave the city and settled in a new city just in the west of the Triumph Gate (Triumphal Arch of Caracalla); (ASOV, 1997). The water was distributed in the city through the covered canals, each neighbourhood had its own special clay pipelines, which were supplied the water of baths, public fountains, temples, theatre and etc., and therefore the pure water became available for the public (Crouch, 2001 & Feldman, 2014).



Fig.11. a same formal instruction in the water pools in the city of Lar in the south of Iran. Source : <http://larestankohan.ir/post.php?id=9996>



Fig.12. A same formal instruction in the water hauzes in Bukhara. Source : Timur and Mankovskaja, 1991

element for Muslims present it as a healing and resuscitative components in their life. In the Islam civilisation water has a strong meaning and concept, this is the water due to that the Muslims washing themselves, farming, the water which washes away all impurities, heals the sick and fulfils the thirsty man. The water, which is coming down as a rain and revives the dead lands. This is the water based on which and beside which the Moroccan cities were shaped and expanded during centuries. In Moroccan cities the way that water is emerged reveals its important and sacred position: with special and condense decoration. Water has a pivotal role in the religious ensemble (such as Ben Youssef Ensemble), and in the sacred properties like madrasas and mosques, water is the leader in the spatial structure of the courtyards. In these sacred ensembles and buildings, water is not just a component of a place, but it appears as a sacred element in these places (like the central fountain in the courtyard of the Zaouia Moulay Idriss II in Fez).

Formal and aesthetical common language of Saqayehs

Until now this kind of multidimensional and multi-functional emergence of water

infrastructure in the Moroccan cities reminds us the same example in the cities in the Iranian plateau. In the cities like Lar, Semnan, Bukhara in which the multidimensional role of these networks enclosed in the formation of spatial structure of the city, locating the public and sacred services between the city and in the integration with subjective and ritual beliefs of citizens transforms them from the mere natural-physical and geographical component to the more ritual- cultural and social- individual and symbolic components. But one thing makes the Moroccan examples more unique: a formal and aesthetical approach makes these components more dynamic and monumental elements in the urban landscape in Moroccan cities (Fig.10). An approach which was though pursued in the cities like Bukhara with its unique Hauzes (Fig.11) or in the city of Lar with its frequent form of pools (Fig.12). But here, in the Moroccan cities the Saqayehs as the last ring in the chain of water infrastructure are presented with the more condensed ornamental form and repeated in the urban landscape of Moroccan cities with their unique decorative forms. This formal and aesthetical consideration attached to the Moroccan water networks more conceptual role



Fig.10. the same instruction in the ornaments and the formation of the saqayehs in Morocco in different scales and contexts. Photo: Ayda Alehashemi, 2016.



Fig.5. Qana sidi saidi in the junction of three alleyways near the sidi saidi zaouia in the beginning of the 18th century. Photo: Ayda Alehashemi, 2016.

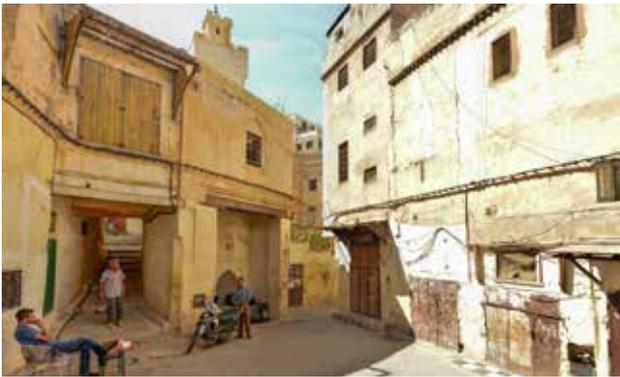


Fig.6. A neighborhood center in Fez. The emergence of Saqayeh and small shops in the open places in the junction of number of alley ways is the common pattern in the Moroccan cities. Photo: Ayda Alehashemi, 2016.



Fig.7. A qana in front of Bab al Aqla in the city of Tétouan. Photo: Ayda Alehashemi, 2016.

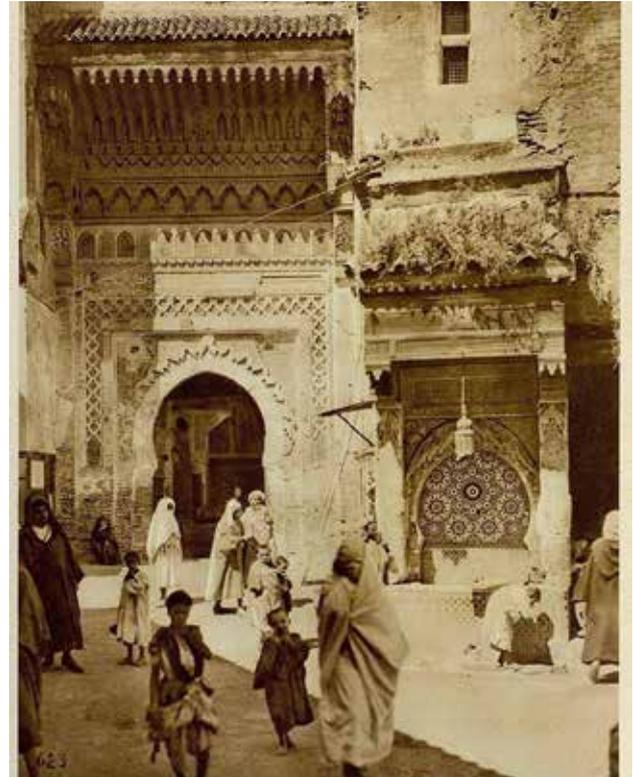


Fig.8. El Najarieen caravansary in Fez, urban field in front of the main entrance and the Saqayeh between this area. Source: <https://ajdadalarab.wordpress.com/>

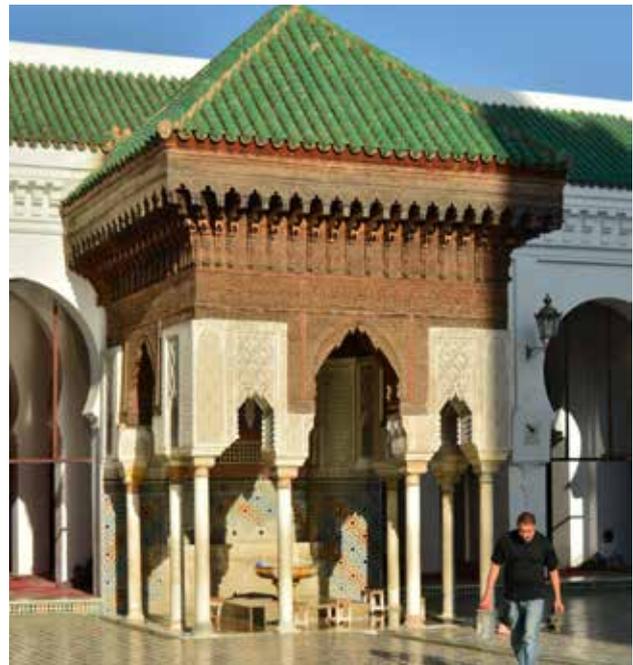


Fig.9. a place for fountain in the courtyard of the mosque of Al Quaraouiyyine in Fez. Photo: Ayda Alehashemi, 2016.

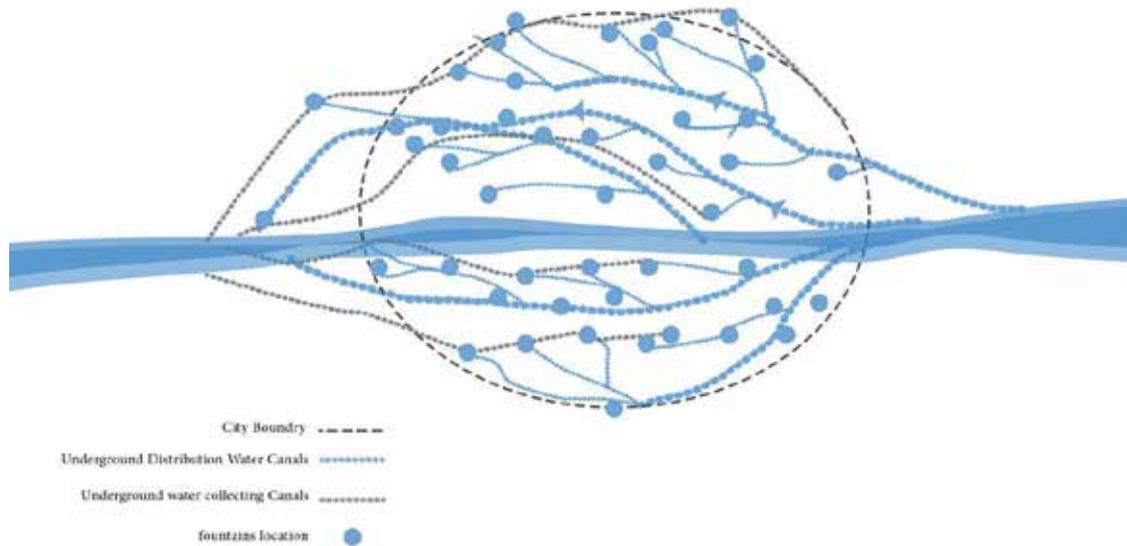


Fig.4. Schematic plan of the water infrastructure of Fez. Photo: Ayda Alehashemi, 2016.

madrassa, baths, they also appear in front of the mosques in the alleys or inside the mosques and madrassas courtyards. In fact, topologically anywhere that water movement allows the water flow from the fountains, the alleys meet together and the neighborhood centers emerge, places which are encircled with public services such as mosques, madrassas, baths and Saqayehs and in some cases they are just the places for the formation of open spaces with a fountain and some small local shops. A place where the water emerges on the earth is the start point for the formation of public services and neighborhood centers and in the second layer other urban fabrics. Reading the urban landscape according to the water emergence in the urban fabric reveals that the spatial structure of Moroccan cities is incredibly followed the topographical features and natural context of these cities and therefore the water flow and emergence in these cities. This integration with the water in these cities makes this obvious to find the fountains in every focal place in the city. This permanent presence of this important component of water infrastructure all

around the city with different volume and scale (Fig. 6 & 7), makes the Saqayehs one of the main identical monuments in the Moroccan cities.

The location of Saqayehs and the formation of urban pivot points and important Functions

Beside the role of water infrastructures in the formation and the location of public services and main urban functions among the city, the permanent companionship of the saqayehs with the city gates, sacred utilities like madrassa, mosque or khanqah which may not always be positioned in the junction of the alleys or the neighborhood centers, shows the deep connection and inseparable integration between water infrastructure and the urban utilities (Fig.8). The water infrastructure integrated with sacred private spaces appears as a fountain in the courtyards of madrassas, mosques or khanqahs (Fig.9).

The subjective position of the water infrastructure in Moroccan cities

The role and the importance of water as a sacred

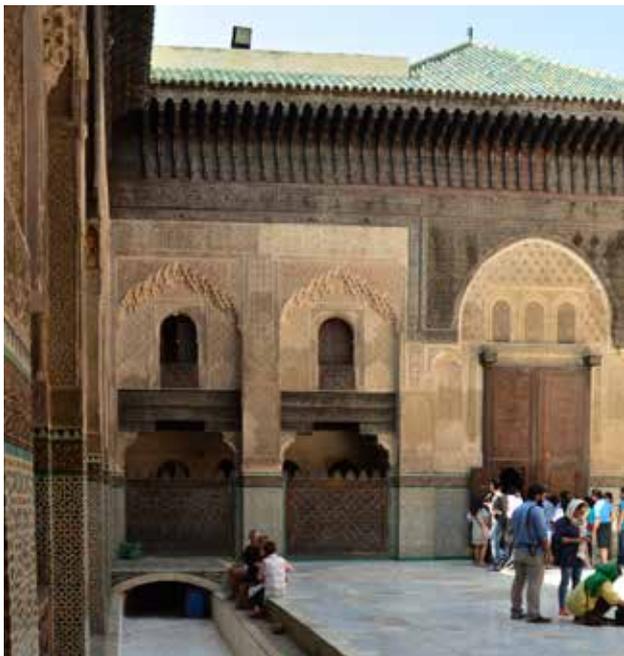


Fig.2. The water canal in the courtyard of the Madrassa Bou Inania passes in front of the main loggia.
Photo: Ayda Alehashemi, 2016.



Fig.3. the central fountain in the Zaouia Moulay Idriss II in Fez. Photo: Ayda Alehashemi, 2016.

The Fountains in the Moroccan cities

Fountains as the last ring in the chain of the water network in the Moroccan cities and as a place where the water emerges in the public, semi-public and individual places among the city are ultimately glowing in the urban landscape of these cities. The place of the water emergence, its relation with the spatial structure of the city and the public facilities of the city, as well as its way of appearing and its unique aesthetic and formal language which is generic in all Moroccan cities, are the considerable facts that this article tries to define during its survey on the water infrastructures in Moroccan cities. These uniform fountains in various Moroccan cities appear with different names: 1- Saqayeh (in Fez and Marakesh): In Arabic this is an infinitive which means to water, also as a noun means the instrument uses for watering or the large bowl or pond where the water is gathered. It also means a cup uses for drinking water (safipourShirazi, 2009). It also refers to the place where water is reserved especially the one in the mosques (Qazi Zanji Sanjeri, (1956). 2-Qana (in Tétouan): canal or the duct, Qanat, water conduit, sewage conduit, making water canal, digging water conduit (safipourShirazi, 2009) (Qazi Zanji Sanjeri, (1956). 3- Sabilah (in Chefchaouen): the path or the obvious path, way or manner in common sense (safipourShirazi, 2009). 4- ‘Aiin’ (in Chefchaouen): in some cases, in Chefchaouen the word of ‘Aiin’ was used which means the spring, a waterskin from which the water flow (safipourShirazi, 2009).

the word ‘Saqayeh’ mostly uses to ‘In this article refer to these unique fountains.

The location of fountains and the role of water

infrastructures in the spatial structure of Moroccan cities

From the point of the location, the Seqayehs are positioned in the specific places: in front or near the main gates of the city, in the squares, in the entrances and the open areas across the bazaars, in the junctions of alleys, under the ‘Sabbaths, in the neighborhood centers beside the mosques,

Water infrastructure in Moroccan cities

The considerable amount of the water was the main factor in the foundation of the cities in Morocco. Fez, Tangier, Tétouan, Chefchaouen, Meknès, Rabat and Marrakesh are the good examples for this kind of replacement. All of these cities are located on hillsides and valleys which are nourished by abundant rivers and springs. In Fez for example, the city location to the main had been chosen not only according trade roads, but also according to being beside the Sebou river as one of the main rivers in the plain. The river was the source of the water in the city and the complex network which distributed the water (Personal of Fez Master Plan, 1980). There are many narrative records which had described this river and its conjoined network in the city of Fez, which gives us the opportunity to imagine the water network of the city in its heydays: a pearlsh stream and as a treasure of vital resources, in Fez the water flows everywhere. In mosques like a smooth and clear mirror for Wudu, in canals for agriculture, and in a form of fountains and monuments which have been carved on the wall ornamented by ceramics with arabesque patterns...) ial jazna in kahera, 'The river of pearls and it arises in the plain to the west of the city, almost sixty miles away, from about sixty separated springs. Its movement is scarcely visible until the point where it enters the town. Here it breaks into a sheaf of rivulets which flow to the various districts feeding fountains of mosques, streets, and individual; houses, driving mills³, filling baths, irrigating gardens, and removing, on leaving the city, all refuse and impurities'(Al jaznai in kahera,2012 :14). Therefore, we can illustrate the water network of Fez as such: the water entered the city from the main resource which was the Sebou River, in the entrance of the city the water divided in the canals and flowed in the various neighborhoods of the city. This network during providing the required water for tannery⁴, mills and baths, emerges every places among the city where the topography and slopes allowed: in a shape of ornamented fountains over the walls (Fig.1),

uncovered canals in the court of mosques and madrasas (such as Madrassa Bou Inania in the city of Fez); (Fig.2), or the ebullient fountains in the Middle of the courtyard of the madrasas, mosques, khanqahs or mausoleums (including Mosque of al-Qarawiyyin and Zaouia Moulay Idriss II); (Fig.3). At the end, all the water canals integrated together and left the city and the pollution and sewage were washed away from the city alongside the river. Almost in all cities which are positioned in the west of the Atlas chain the water infrastructure has emerged in a similar way. Today, in the cities of Tangier, Tétouan, Chefchaouen, Meknès and etc., the same system still works and the water flows from the fountains naturally or with the help of pumps (Fig.4).



Fig.1. seqayah alsiaje in Fez. Photo: Ayda Alehashemi, 2016.

Introduction

Morocco is a country with two types of climates, the Mediterranean climate in coastal areas in north and east with remarkably moderate temperatures, and the desert climate in the other side of the Atlas range near the 'Sahara'. The region with moderate climate between western slopes of Atlas range and Atlas Ocean consisted of the vast green plains nourished by rivers come dawn from Atlas Mountains¹. The most important cities of Morocco are situated in these plains: From Tangier, Tétouan, Chefchaouen and Meknès to Casablanca, Rabat, Marrakesh and especially Fez- the first Islamic city and which was founded on a bank of the Sebou river-. In the cities of this region where the water is abundant, the water networks and infrastructures had been emerged with a same language.

Today, when we walk in the dense fabric of historic medinas in the Moroccan cities, we face with the frequent elements of water infrastructures with the active role in their urban landscape. By focusing on the city of Fez, Tétouan, Chefchaouen and Marrakesh, the paper puts into question the role of urban

water infrastructure and its various social and individual aspects in the Moroccan cities. After looking into the role of water infrastructure in the spatial, social and subjective structure of Moroccan cities, this paper focuses on the aesthetic aspects and the common formal-ritual language of water infrastructure in Moroccan cities specially the fountains as their most scenic component. These aesthetical elements brought the water networks of Moroccan cities far more beyond their similar ones in other Islamic countries in Middle East like Iran. By looking into the formal-historical and formal-traditional aspects of the fountains in the water infrastructure in so-called cities in Morocco, this paper tries to highlight this particular aesthetical emergence of water infrastructure and its roots in Moroccan cities. Yet, in this survey the main references are the information having been gained from the valuation and analysis of the field research observations in these cities, and the further studies based on library research method organized in order to demonstrate these field study evidences.

Literature Review

For the centuries, The Moroccan cities were considered as important Islamic cities and had been among the main destinations for European and Muslim tourists. First documents about Moroccan cities were the diaries of these tourisms and other Muslim philosophers such as 'Ibn Khaldun'.

In the 20th century, Islamic studies scholars such as 'Titus Burckhardt' and 'Najm al-Din Bemaat' had looked into the historical Medina in the Moroccan cities. Although these books did not directly mention the water infrastructure in these cities, but during their description about the presence of water in these cities, they pointed out the evidence about the water infrastructures. During 20th centuries and French conquest, French experts made considerable efforts in understanding the urban

structures and organizations of Moroccan cities, in which the water infrastructures did not come into focus solely or even as one the main factors in Moroccan urban structures.

During the revitalization programs in the Moroccan cities, especially Fez in the 1970s, the deep surveys were taken place in the field of urban structures and the water infrastructures as one of considerable urban infrastructures in these cities. The reconstruction and revitalization of urban water supplies and fountains was a part of the integrated program of rehabilitation and reconstruction plan in Moroccan cities during the 1970s and 1980s². However, the independent studies which reflect the relation of these networks with social, cultural and spatial structures of the cities and quotidian life of citizens were not conducted.

The Landscaping Emergence of Water Infrastructures in the Cities of Morocco*

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Abstract

The urban water networks in Morocco just like other countries in North Africa and Middle East represent complex networks, which are integrated deeply with various aspects of social life.

The water networks in the Moroccan cities still play a pivotal role in the urban landscape where the traditional fountains with their repetitive formal instructions in Chefchaouen, Tétouan, Tangier, Fez and Meknès gains a significant attention of each visitor. Why and how the water networks emerge and work in this special way in the cities of Morocco, is the question that this paper tries to find the answer for.

Visiting the cities of Morocco and deciphering the relation between the fountains and the urban structure and topography shows that these fountains (places where water emerge) as a last chain of the water network in the Moroccan cities have roles more than a mere functional one. Analyzing the information gathered in the field visits states that these elements coincide completely with the topographical situation of the cities, and are the focal points in the formation of urban facilities, city centers and neighborhoods, and even more in the organization of residential fabrics. These elements have considerable presence in the main urban components such as, mosques, Hammams (public bath), Zaviehs (rooms for dervish), further to the city centers, neighborhood centers, and city entrances and gates, in the open spaces in bazaar and so on.

The results of this brief survey also show that besides the decisive role of the traditional fountains in the spatial structure of Moroccan cities, with their special aesthetical instruction and semi-mihrab form integrated to the Moroccan subjectivity and familiar ethics, these elements play a significant cultural and an identical role in the Moroccan cities. Synthesizing the result of field observation in the Islamic Moroccan cities and the remains of the ancient roman city called Volubilis, near the city of Meknes, revealed the relation between indigenous and Islamic rituals and roman traditions in the field of water networks and their main elements, fountains.

Keywords

Water network, Urban landscape, Fountains, Morocco.