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DECOMPRESSION VERSUS COMPRESSION FOUAR ANTELIAS: A GUSHING WATER RIVER

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ABSTRACT

The adopted theme in this study is the re-conquest of the Fouar Antelias river scape, the river with gushing water. After exploiting its resources in an irreversible way, today humans are facing a stage of reconciliation with the river. The materials and methods used to understand the site Fouar Antelias were firstly a speleological analysis of its springs. Then, the numeric study of the historical evolution of the bank interventions and elements using arcGIS showed the landscape lost spirit of place. Taking pictures from the same place during a year, after monthly visits, revealed the river scape dynamic temporalities. And the Cultural Value Method and Knowledge Attitude Practice method determined the social perception of the river. For the results, the suggested project on the river borders was based on the gushing water, its unique element. The adopted concept was provoking the Decompressions *vs*. Compressions explained in the speleological analysis. Deconstruction by means of Land as Art, referring to the breaking of the earth by the water Decompressions and Compressions, is the project architectural movement. The obtained plan is divided into four thematic zones from downstream till upstream. The sloped passages, the furniture emerging from the ground, the choice of plantations falling and rising and the presence of water strengthened the chosen concept. Zones of meetings, kiosks, playing area and finally a festivity zone will lead to the purpose of our linear promenade: the gushing water. Details, sections, perspectives and sketches specific to each zone supported the schematization of the concept.

Keywords: *Riverscape, Fouar Antelias, gushing water, decompression, compression.*

INTRODUCTION

The river is a stream, of different sizes, which flows into the sea. Submitted to concept of fluvial hydro system, it presents four dimensions: longitudinal, transverse, invisible and temporal (Valette, 2006). Rivers have always been a source of attraction for human; their banks were the first inhabited territory. Despite being a natural resource, water was also considered due to its seasonal

dynamism, as a constraining factor for men, a field of floods. In the face of these challenges, man built bridges to bind the banks, narrowed and curbed riverbanks to limit flooding and covered riverbeds allowing passage of roads or even constructions. The rivers were abusively exploited and thrown behind the backs of humans, considered as curses in cities. Lebanon, a Mediterranean country, has 17 perennial rivers (Khouzami et al., 1998). Its richness in streams and its diversified relief allowed the creation of many types of river landscapes: mountain, piedmont, plain and sea. The riverside civilizations occupied the borders of its rivers, the banks being places for fishing, water mills, agriculture and various occupations before becoming spaces for constructions, industries and places of parking. Our study focuses on one of the Lebanese rivers characterized by its gushing water, the Fouar Antelias. Being the smallest coastal river, its length not exceeding two kilometers, the Fouar undergoes since the beginning of XXI century an irreversible transformation in the functions of its banks. Source of irrigation for orange trees planted all over the plain of the city of Antelias in the past, this river recently constitutes a network of sanitation sewers of neighbouring cities with the invasion of urbanization. Its distinguished sources, its historic bridges and mills and its aqueduct are assets of revitalization of this neglected river landscape invaded by buildings, markets, multiple restaurants and cafes and their parking places. Given the primordial effect of a river in the life of the people, and the perpetual modifications of the banks occupations with time according to the definition of the river; given this lack of awareness of the Lebanese about rivers and their importance today, and in our case this unconcern of people towards the river and its elements in addition to the discharge of the sewers in its bed; What functions should be provided to the new banks in order to restore the lost connection of people with the Fouar river, while preserving its vestiges and rehabilitating its neglected spaces? How to illustrate its gushing water in landscaping? How to highlight its forgotten heritage elements? How to rethink the Orange plain? What concept to adopt while respecting the existing natural dynamism? How to rethink this river landscape with the increased construction of restaurants and buildings, critical elements threatening the river's potential? It is assumed that the development of a linear walk on the river may reinforce the lost link between people and the Fouar. This walk is carried out following a decompression versus compression reminding its gushing water, with zones of meeting, kiosks, playground and festivity. While taking advantage of the presence of heritage elements to create key areas, the objective of this paper is to reconnect people with rivers through riverbanks' landscaping.

MATERIAL AND METHODS

This paper is based on the site's observation during a year (June 2016 till May 2017), in order to understand it before adopting any project concept. Several methods were used to determine the physical and social/cultural aspects of the Fouar. Referring to a speleological study, the physical mechanism of water Decompression versus Compression was analysed. A cartographic comparison was

made using ArcGIS to show the evolution of the land use on the river's borders. A physicochemical test of the quality of Fouar's water was done to ensure a proper walk on the river sides. Taking photo from the same place every month helped the observation of the natural dynamism of the water, the existing riparian vegetation and the seasonal temporality of the river. The Cultural Value Method, elaborated by Stephenson was used to organize the landscape readings of the Fouar. A KAP (Knowledge Attitude Practices) survey was conducted over 50 participants, aged from 12 till 81, half of them were locals living near the river in Antelias and the other half lived at a maximum distance of 10km. Questions concerning the knowledge of the river's source and elements; their representations of the river, the necessity of the riverbanks rehabilitation project; their access to the river, if they have ever walked near the river and the activities they wish to make in the river area. The reason behind this survey was to better understand the social perception of the river and the participants' needs concerning the intervention landscape project on the riverbanks with plans, sections and perspectives taking into consideration all the obtained data.

RESULTS AND DISCUSSION

First of all, referring to the Fouar's speleological studies, the water that spurts out in Antelias comes from an underground mountain river (Hakim *et al.*, 1988). This water is subjected to a decompression, under the effect of the flow of the precipitations and the slope. It reaches an impermeable block and the decompression is transformed into an upward compression allowing the spurt of the water and giving this singularity to the Fouar. Having made an ecological inventory of the Fouar's flora, the dominant plant is the giant cane, *Arundo donax*. The mass of this plant provides an aspect of naturalness to the city, and draws the path of the river. According to a physicochemical test made on samples of water taken from the Fouar, the adoption of the idea to create a walk along the river was allowed due to the good quality of water that can be used for irrigation following the LIBNOR standards.

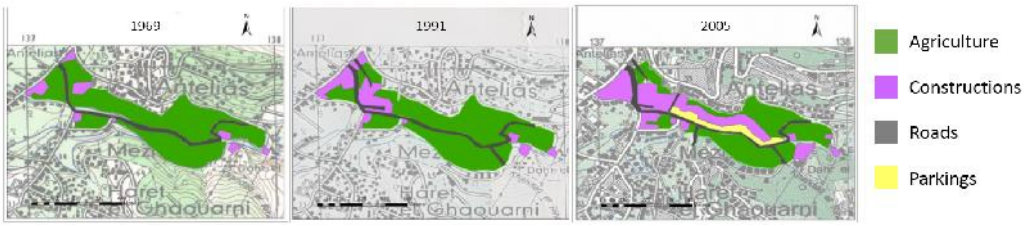


Figure 1. Evolution of the land use between 1969 and 2005

Taking into consideration the evolution of the land use next to the river, the ArcGIS study (Figure 1) showed a decrease of 44% in agricultural lands from 1696 to 2005, this decrease being the largest after the end Lebanese Civil War in 1991. This 44% is divided into 33% of buildings, 2% of new roads and 9% of parking places in 2005.

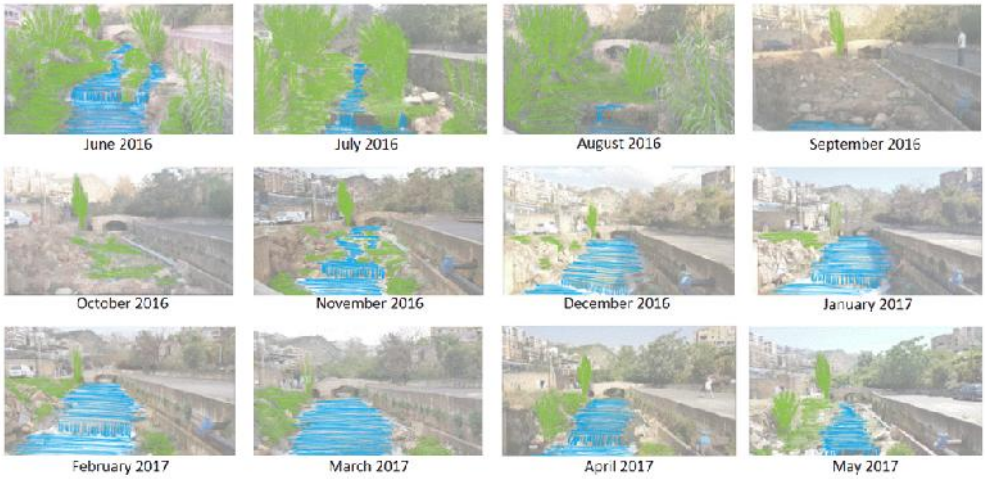


Figure 2. Kaleidoscope of the Fouar temporality during a year

Donadieu had spoken of the dynamism between nature and society in the river landscape (Donadieu *et al*., 2007). The kaleidoscope (Figure 2) expressed by taking the same photo each month, shows the natural time present in the Fouar through an interaction between water and fluvial vegetation. The level of the water decreases in the hot seasons and increases in the cold ones. Regarding vegetation, its growth is clearly visible in the first three months, before the municipality of Antelias makes a decision to 'clean up' the river, causing a break in this growing cycle over the seasons. A new cycle starts again after one month of tearing.

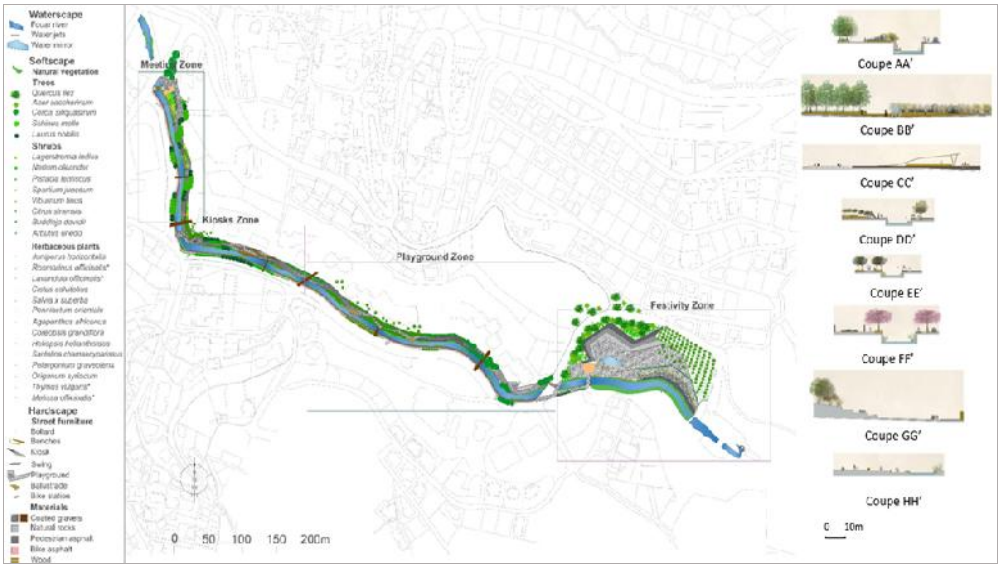
Concerning the perception of the Fouar, factors of this river were organized (Table 1) following the cultural value method (Bergstrom *et al.*, 2017) to better understand the site.

Table 1. River's perception using the Cultural Value method

Factors	**Descriptive characteristics**	**Cultural Values**		
		Forms	**Relations**	**Practice**
Flora	Continuous development, Wild, Diversity	Distinction between herbaceous strata	Endemic plant, Emblem of the river landscape	Ecological value
Water quality	Homogeneity, Color, Cleanliness	Agitated	Nourishing river	Fishing, Irrigation, Meeting place, Drinking water
River elements	Human interventions on the river	Watermills, Aqueduct, Bridges	Symbolic representation of the man-river relationship	Hydro-electric power, Water conduct; Banks link

*Source: Author's elaboration based on the site observation.

Donadieu spoke of an Object-Space that is the river and a Subject-Observer who is the man (Donadieu *et al.*, 2005). So in order to fully understand this relationship between the object and the subject through the perceptions (Luginbuhl, 2003) and sociological behaviors of people towards the Fouar and to adapt a suitable landscape project, the data of the KAP method survey were considered. 74% don't know the origin of the water' source and 76% know the existing elements like the watermills, bridges and aqueduct. The Fouar River represents for them mostly an ecology, heritage and sewers site. All the participants think that its rehabilitation is necessary. 66% have walked near the river and 78% have access. Meeting and multipurpose spaces, games and kiosks are the participants' needs concerning the project in the river area. All the inhabitants of Antelias want kiosks along the river.
So the chosen concept was: Deconstruct the land according to the Land as Art, as if it resulted from a spurt of water to provide users with the striking effect of decompression, and then that of compression. It is a linear park, divided into four areas from downstream to upstream continuously organized with furniture and vegetation specific to each. The walk is directed against the flow of water. The plot lines of the plan become more and more abruptly alternate when approaching the gushing water. The jets of water scattered every fifty meters create a chronic waving for users. The bike path is on the side of the road. The sidewalk next to it will be woven every hundred meters by written words about the Fouar and its oranges. And finally the bridges will be covered by gravel coated with a different color than those of the passages to extend their visual effect.
The depiction of Fouar's decompressions and compressions in the development of the walk on its edges will reinforce the lost link of people with this river. This walk (Map 1), which aims to reach the springing water of Fouar, is led by passages of decompressions and compressions with mineral, vegetal and aquatic elements emerging from the earth recalling this spurt. Then, the walk is divided into sequences downstream to upstream according to the expectations of local residents: meeting, kiosks, games and festivities. The mineral concept considered the 'spouting' of the furniture of the earth. The plant concept has adopted falling plants in areas of decompression and emerging in areas of compression. The stratification of these plantations referred to the strata of the riparian forest. Their mixture between deciduous and persistent recalls the seasonal dynamism, and the addition of the orange trees, reminding of the citrus plain of Antelias in the past. In addition to the existing riparian vegetation that should be kept and maintained yearly. And the water concept is manifested by the water jets dispersed in the four zones which the number increase while approaching the gushing water.



Map 1. The proposed project on the riversides

Figure 3. Meeting perspective

Figure 4. Kiosk perspective

Figure 5. Festivity perspective

In the meeting zone (Figure 3), three walks are offered: two on the banks and a seasonal one near the water. The AA' section shows the atmosphere of this meeting area, with stratified vegetation, mixed between deciduous and evergreen. The BB' section shows the passages of decompressions with falling trees, and compressions with trees and gushing plants. The plant boxes with 0.45m height serve as benches making the space versatile. In the kiosks zone (Figure 4), the dominant function is economic, kiosks selling orange based products. The CC' section shows the architectural language between the emerging bench and the kiosk. The DD' section shows the tier of dwarf orange trees, reminiscent of the Antelias citrus plain of the past, in addition to the side walk with the bike path and plant alignment. The perspective shows the general atmosphere with the bench, the kiosk and the belvedere breaking the distance between the man and the river. In the playground zone, two belvederes are present, formed by the angles of the rigid lines. A swing with corrugated roof referring to the mechanism of decompressions versus compressions offers a view towards the river. A malleable net bench is located next to the play area placed in a hollow to provide user's safety schematized in the FF' section. The vegetation becomes higher when approaching the gushing water. And the festivity zone (Figure 5) is the most agitated area, being directly connected to

the gushing water. The restored bridge is frequented by walkers in order to reach the bench. Seasonal banks will be present on the natural banks between the existing vegetation of this zone. The mill will be restored and transformed into a museum with nocturnal projections on its walls. The section GG' shows how the land is manipulated offering a view towards the aqueduct reflected in a body of water. The perspective shows the atmosphere of this area with its planted edges to reduce the noise of the road. The section HH 'shows the three passages, traced according to the natural temporality of the river.

CONCLUSION

According to the historical, physical, landscape, ecological and social study carried out on the fluvial landscape of Fouar Antelias, one reaches the various riches of this river devalued by the current riparian society. The problematic was: how to give life back to Fouar and through what functions to renew the lost link of people with him? And how to value its unique remains? The hypothesis of creating a linear walk on the river was validated.

"Increasing the ability of communities to support landscape evolutions while taking into account the singularity of places: this is the main objective of the landscape project" (Poullaouec-Gonidec. 2000). So the consideration of the singularity of Fouar, its gushing water, allowed the success of the design of the proposed project.

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