



## Conference Proceeding

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# Public Gardens and Well-Being: The Case of the Raffaoui Archaeological Garden of Setif, Algeria

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**Abstract:** The existence of a space dedicated to nature and gardens in the city enhances the living environment of its inhabitants, preserves biodiversity, and limits urban pollution. This work is based on the analysis of Raffaoui Garden (Ex-Barral) and its location in the historical city center of Setif, Algeria. It is one of the historical markers of the city's stratification of civilizations, marked by the archaeological character of the nymph inherited from the Roman period. In this study, the methodology used is based on a combination of a historical approach, observation, and a questionnaire addressed to the users of the garden. The first results show the importance of nature as an element of differentiation through the aesthetics it brings to the historic center of Setif. They also reveal the lack of urban furniture necessary in this kind of public space. From a functional point of view, the frequentation and use of the park are mainly limited to 50- and 60-year-olds, former residents, and some visitors, despite its location in the city center. This study confirms the environmental benefits of public gardens in terms of mitigating heat islands and improving air quality, although they offer a space cleared by urban planning in the city center. The improvement of their attractiveness can encourage visitors to walk there, observe the local life, or simply contemplate the ecological quality of these spaces and, in particular, the archaeological heritage that coexists with the modern urbanization of Setif.

**Keywords:** archaeological heritage, nymph, Raffaoui Garden, Setif, streetscape, well-being, modern urbanism

## 1. Introduction

The existence of a space dedicated to nature and gardens in the city demonstrates the need for the presence of green spaces within an urbanized space, such as urban public gardens, which are part of the pillars of the city's urban structure and serve as its lungs, thereby contributing to a sustainable urban environment that favors the well-being of its users.

Since ancient times throughout the world, gardens have been created to provide human beings with places for relaxation and well-being [1]. The gardens in general contribute to protecting human life from the point of view of psychological and physiological balance by improving the living environment of citizens in the package to ensure their physical well-being, which is the subject of scientific interest, promoting physical activity, social interaction between visitors in a quiet environment beautified away from the noise of the city, and human interaction with its environment [2]. The green space also regulates the urban atmosphere of the microclimate to ensure the comfort of the user, and its

treatment is a way to rethink the sustainable development of cities.

At the national level, the green spaces are categorized as botanical gardens, collective gardens, pleasure gardens, residential gardens, and private gardens according to the law n° 90-25 of November 18, 1990, and they are put under management by the rules of the development of the green spaces defined by the law n° 07-06 of 253 in 2007 [3].

Setif is an Algerian city that has shown remarkable civilizational passage through a diverse heritage imprinted on its urban form. The historical center of this city has intact urbanism aided by some natural nodes, including the gardens of El Emir Abdel Kader (Ex-Orleans) and Raffaoui (Ex-Barral), two historical gardens of archaeological character that testify to the passage of previous times. This work is based on the analysis of the Raffaoui Garden and its place in the historical city center of Setif, selected according to the law n° 90-25 of November 18, 1990, as a public garden, a place of rest in an urban environment with a role of aeration, and an urban patio with its empty urbanism in a built center marked by a simple design that includes vegetal flowerbeds or trees. This category also includes planted squares as well as public squares with a mineral component; these two characteristics combined ensure a sensory exploration of the environment to enhance the well-being of users.

The urban spaces in Algeria represent a percentage of the full majority and are not proportional to the green space, and in the case where we have such green spaces as the gardens of El Emir Abdel Kader and the Raffaoui, we raise the problem of the weak frequentation compared to the amusement park. The purpose of this research is to identify the crowd, the use of the green space, and its impact on the user's behavior, as well as the benefits of having a public garden in the middle of an urbanized city center. This study also examines the role of green space in ensuring sustainable urbanism, specifically when this green space includes an era's archaeological heritage, which will result in a triple gain in its utilization according to its management and protection of various nature- and archeology-related services. This research, on the other hand, seeks to achieve cohabitation by comparing the new and modern heritage and technology with the ancient remains in the historic center of Setif and the modern installations in this same center, a cohabitation that favors sustainability. This contribution also aims to ensure multi-disciplinary visits linked to the different aspects of the garden (residents, visitors interested in nature and heritage) and study visits (historians, architects, archaeologists, agronomists, etc.), thereby enhancing its heritage, cultural, environmental, and ecological interests.

In addition, the following questions are addressed: "What is the effect of green spaces combined with a heritage remnant in the middle of a historic urban center on sustainable urbanism, and how can they be protected and managed to serve the well-being of users and improve its attendance and attractiveness?".

## 2. Methodology

This research is based on the multidisciplinary analysis of the Raffaoui Garden and its position in the historical center of Setif, one of the environmental pillars within this urban center and one of the witnesses of the Roman heritage being part of the civilization stratification of the city.

The methodology of this study is a hybrid between the qualitative method of observation and the landscape approach to analyzing the garden. This shows how important a vegetable garden is in a fully urbanized area. Meanwhile, the historical and morphological approaches are based on the physical and spatial analysis of the garden's constituent elements and their evolution over time, with the aim of showing its ecological, historical, and archaeological value. This methodology focuses on the incorporation of a sustainable approach and the multidisciplinary protection of the garden.

The quantitative approach supported the analysis in the following step, which involved creating a questionnaire for a number of respondents from various age groups in order to comprehend their uses of the space and the issues they raised. The semi-structured interview, which focuses on general questions about the quality of the garden to determine how the users situate themselves in relation to this garden—their perceptions of the space, their feelings, their frequentation—serves the functional approach, where the space is considered in its dynamics as a movement animated by phenomena of social interaction and their practices in space.

## 3. Results: the case study

The Raffaoui Garden is located in a region known for its abundance of Roman ruins, just a few meters from the

famous Ain el Fouara Fountain in the heart of Setif. This garden is situated in the northwestern section of the historic district of this city, specifically on Barral Square, west of the entrance walls, and near the southern wall. A physical cultural heritage that has an archaeological character marked by the nymph inherited from the Roman era, one of the best-preserved gardens of this city with its open-air monument that makes it like an open-air museum.

Before the archaeological excavations, the place was used as a space for playing pétanque and was planted with plane trees on the square barrel. During the excavation work conducted in 1907 by the employees of the municipality of Setif in search of the underground waterways that had emerged in the form of springs since antiquity in a region known for its abundance of water, it was also one of the factors that led the Romans to choose this site near the walls of the Byzantine citadel. Vestiges of the Roman period buried under 3 m deep were discovered (Figure 1). These remains consist of a furnished fountain called “nymph”, which symbolizes aesthetic and utilitarian value.

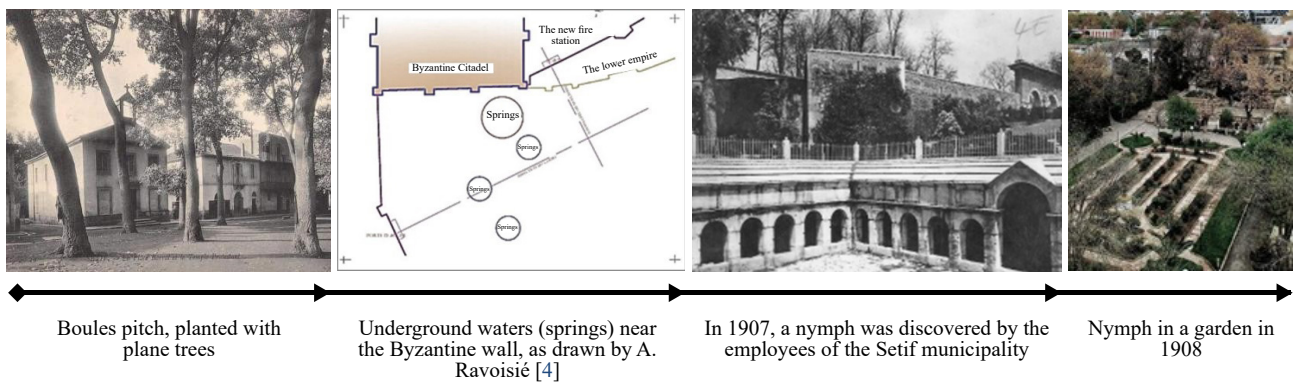


Figure 1. Historical stratification of the site

One year after this discovery, the same authorities integrated the Roman heritage into a garden and presented it as an open-air museum. This heritage is important and should be taken into account in the elaboration of new urban and architectural projects to ensure a functional mix [5]. With the exposure of the Roman heritage of a nymph, a garden, and a space of meeting and entertainment, the latter was also intended for spectacle and other events. The French placed a stage leaning against the Byzantine wall to use as a stage for the event (Figure 2).



Figure 2. The stage as added by the French

In 2001, the garden was renovated to improve its general condition and ensure the well-being of its users. The water tower was rehabilitated, and 52 archaeological pieces (Figure 3) found in different corners of the garden were exhibited to enrich the display of this archaeological heritage, describing the civilizational stratification that shows a good cohabitation between the heritage and the developed city and also demonstrating a double character: vegetal and mineral, which is a spacecraft with its empty plan marked by the combination between the Roman monument and the garden's design that dates back to the colonial period, the latter of which remains in harmony with the rapid development of the city that meets the needs of sustainable development and users' well-being. The Nymphaeum is also used to supply the two famous fountains of the city, Ain Fouara and Ain Droudj, as it has always been the case on the entire territory of Setif that many resources have been exploited in the farms and villages using wells or reservoirs [6].



Figure 3. Archaeological pieces discovered in the garden

#### 4. Discussion and interpretation of the results

By using the qualitative method, starting with the observation of several field visits and the application of the landscape approach, we found that the garden is a space in a fully urbanized setting. According to the landscape point of view and Kevin Lynch's approach [7], the Raffaoui Garden has a weak visual dimension (less visible and legible due to its location in the neighborhood, with visual weakness due to the lack of distance from the buildings and hotels). Therefore, in the first step, we will determine the degree of this ventilation and refreshment by applying the morphological approach to the development of the physical elements that constitute this garden. This garden has an area of 40 ares and 60 centiares and is characterized by a dual character: mineral, marked by the Roman monument called Nymphaeum, and vegetal, marked by the alleys of greenery and their species, as well as a historical approach to understanding the historical development of its elements.

The vegetal characteristics of the garden: 70% of the pavement is vegetal, with different species organized and delimited (Figure 4). This variety of species purifies the climate, decreases the heat, refreshes the temperature, and improves the beauty of the place and the space, which will influence the small scale of the garden by satisfying the users and assuring their well-being, and the big scale by appeasing the atmosphere of the city by providing a climate-refreshing green space (Figure 5).

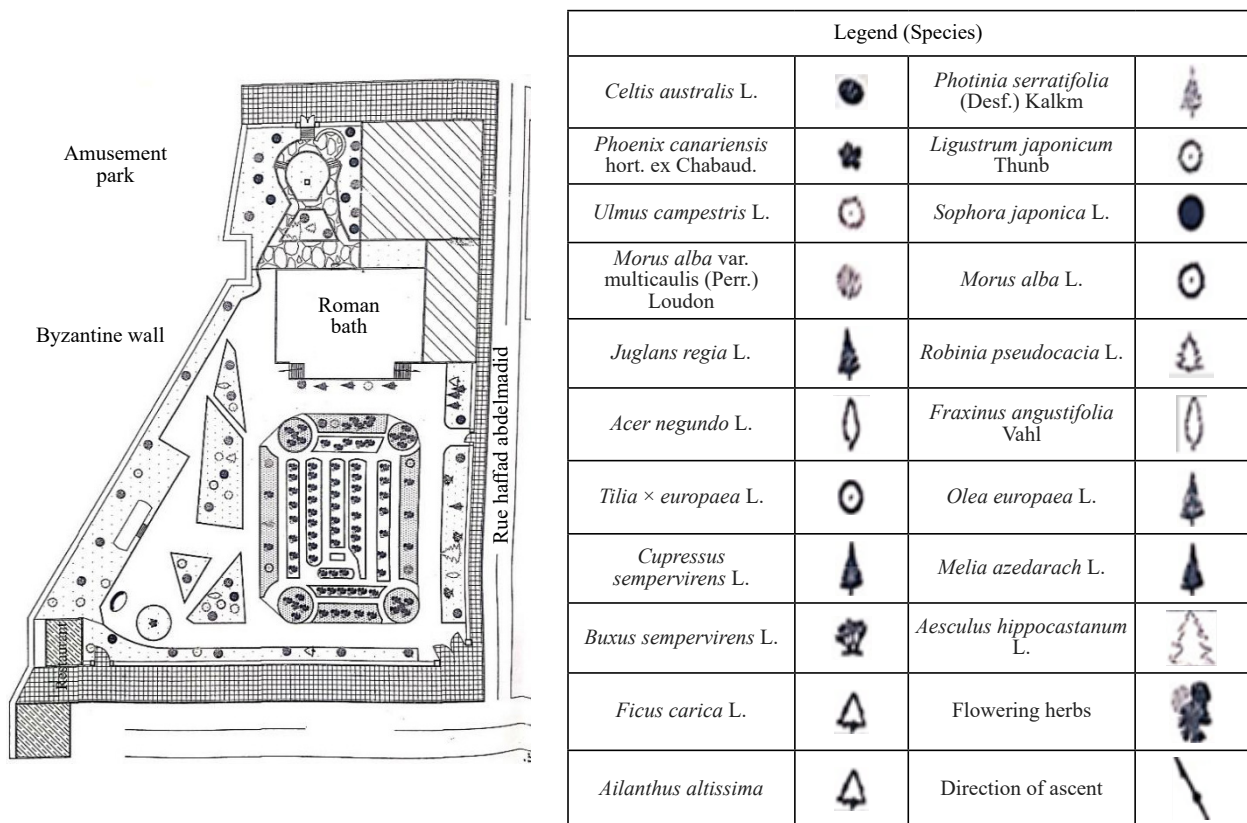


Figure 4. Plant species of the Raffaoui Garden



Figure 5. Green space of the Raffaoui Garden

The mineral characteristics of the garden (Figure 6): 30% of the garden is composed of passages, while the nymph (Figure 7) represents the archaeological heritage comprised of unearthed remains and artefacts that testify to

the existence of ancient civilizations. It was buried three meters deep and has the shape of a large rectangle with three sides formed by a vaulted and perpendicular masonry pipe [8]. The fourth side is open and dedicated to the staircase, with two opposite flights. The inner surface of the U-shaped courtyard (Figure 8) provides access to the fountains that supply water from gargoyle faces carved for decorative purposes (Figure 9). A relic that ensures the uniqueness of this garden by virtue of its historical patrimonial value will attract attention to preserve this garden in a strict manner, and its management can leverage this to capture the attention of visitors, thereby integrating it systematically into the sustainable development.

The garden is also equipped with some benches and a platform from the French period, which were used by the people who frequented the garden.

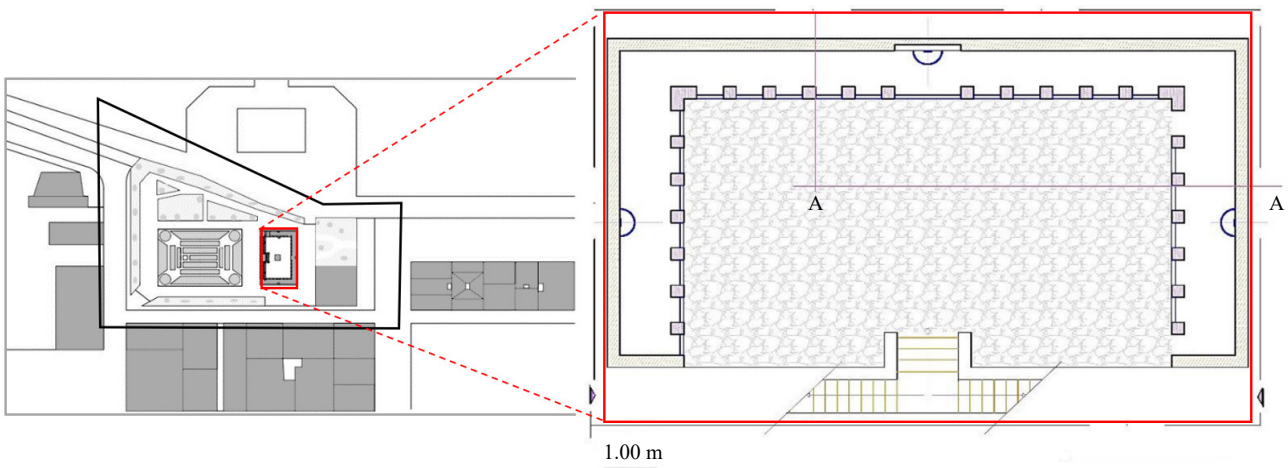


Figure 6. Ground plan of the Raffaoui Garden

Figure 7. Plan of the nymph of the Raffaoui Garden [4]

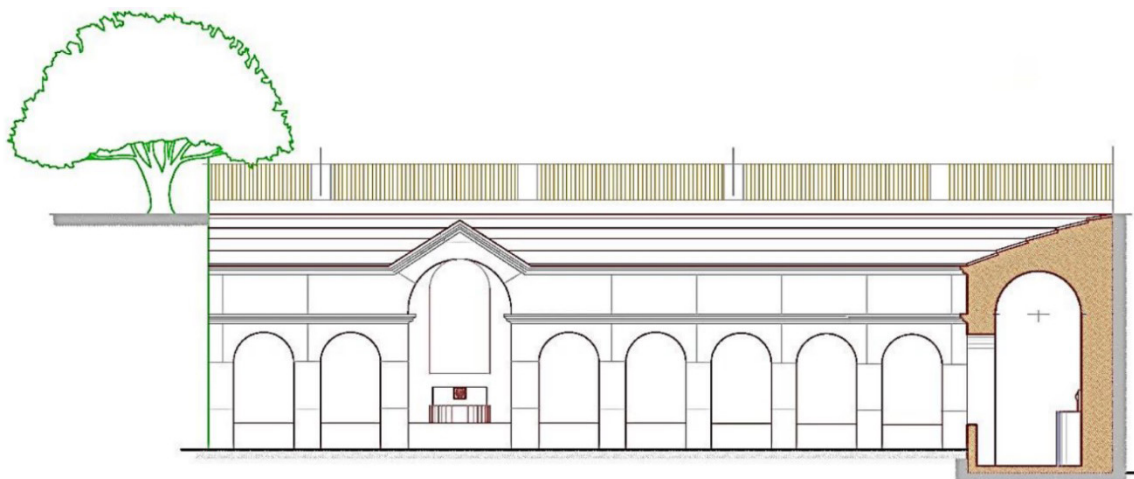


Figure 8. Section of the nymph of the garden [4]



Figure 9. Nymph of Raffaoui Garden (vaulted passage and fountain)

According to the distribution of functions, places can be classified as either monofunctional or polyfunctional. The Raffaoui Garden is polyfunctional in terms of its use, architectural design, and the archaeology and agronomy of its elements.

In its hybrid conception, this garden functions as a streetscape, with its vegetal portion defining its empty urbanism. The Roman monument incorporated into the garden, which combines to create soothing sensorial effects in the users through the coordination between the water of the archaeological hydraulic part and the freshness of nature, provides a sense of well-being and tranquility in the face of urban disturbances. This is what we obtained from the responses of the users who take advantage of the green space's freshness (Figure 10). Each has its reason for visiting: relaxation and entertainment, visiting the heritage, feeling thermal satisfaction, meeting friends, and being a refuge or a place par excellence for the elderly city center residents [9] (Table 1). This resulted in the anthropo-spatial approach, which takes into account not only the location as an urban space with morphological characteristics but also the sociological use of this space. To ensure the sustainability of these social exchanges, we must systematically protect these public green spaces (Figure 11).

The results of the analyses, whether historical, morphological, or anthropo-spatial, demonstrate the value of each garden component and its heritage as an identity for the locals. The analysis of the questionnaires and interviews reveals the interest and significance of nature as a differentiating factor, not only because of the aesthetics it brings to the historical center of Setif but also because of the well-being it brings to the residents, passengers, and visitors who spoke not only of this green space and its environmental value but also as a monument to include in the itinerary of visitors and tourists.

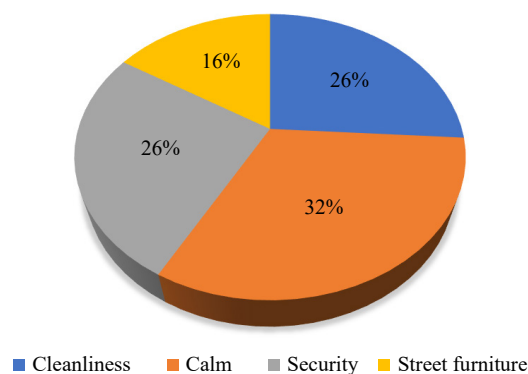


Figure 10. Interpretation of the questionnaire on the use of the garden

**Table 1.** Users of the garden according to time

Duration	Morning	Afternoon	Evening
Attendance	Empty, with the exception of a few students and teachers who visit the garden for study and research purposes	Visitors of all ages visit the garden and archaeological remains	The elderly, local residents



**Figure 11.** Garden attendance during the day

## 5. Conclusion

This study confirms the environmental benefits of public gardens in terms of mitigating heat islands and improving air quality. In the city center, public gardens provide an area free of urbanization. Users' interaction with the garden positively impacts their psychological and physiological well-being. The users benefit from the clear, quiet, open, and cool space within urbanized city centers, viewing it as a space of escape and seeking well-being. In the middle of the historic district and in the midst of noise and activity, these calming and quiet spaces promote the well-being of the locals. Transitioning from a rapidly developing world to a soft, green urbanism with stone, nature, and greenery is crucial for achieving sustainable urbanism. Balancing built and empty spaces, old and new, heritage and modernity, is essential, as demonstrated by the Raffaoui Garden located in the heart of the city of Setif.

With this rapid development and unrestricted urbanization, it is not impossible to have green spaces in the heart of modern city centers to provide pleasant places that can absorb CO<sub>2</sub> from car exhaust while also promoting environmental ventilation. But despite that, the garden is less frequented due to a lack of visibility, a lack of perception, a remote location, and a lack of activity. The creation of a vegetable itinerary, patrimonial itinerary, or spectacles to incite people to visit the heritage, starting from Ain el Fouara, is expected to open perceptions towards sustainable tourism. This heritage coexists with technological development and is privileged for sustainable tourism growth. On the other hand, we noticed that the users appreciate having such a green space within an urbanized and rather developed center because it ensures, in a way, their psychological and physical well-being.



The improvement of the garden's aesthetics can encourage visitors to take a walk there, observe local life, or simply contemplate the ecological quality of these spaces and archaeological heritage [10], which remains in harmony with the modern urbanism of Setif to this day, thereby ensuring the garden's sustainability and the durability of an open green space in an intact urban environment [11]. This garden is regarded as an excellent refuge from the noise and pollution caused by daily activities and transportation.

## Conflict of interest

There is no conflict of interest in this study.

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## Appendix

### Questionnaire

1. Name: \_\_\_\_\_

2. Age: \_\_\_\_\_

3. Do you visit the garden regularly?

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4. If yes, at what time of the day?

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5. For which reasons?

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6. Do you enjoy the garden (landscape, fresh air, etc.)?

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7. What do you like about the garden (calmness, security, cleanliness, furniture, etc.)?

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8. Do you want to improve the quality of the garden?

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9. Do you think the garden is safe, clean, and quiet?

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10. What do you want to change, add, or improve?

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Interview

1. Name: \_\_\_\_\_

2. Age: \_\_\_\_\_

3. What do you think about the existence of such a green space in the city?

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4. Do you think the garden is well used?

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5. Do you find that the Raffaoui Garden provides for your well-being?

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