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Comparative Analysis of Design Elements and Evolutionary Patterns in Urban Parks (a Case Study of Luxembourg Garden in Paris and Park of Tête d'Or in Lyon) for Educational Purposes

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ABSTRACT

This work presents a detailed morpho-functional analysis of two iconic urban parks: Luxembourg Garden in Paris and Tête d'Or Park in Lyon. The 2023 studies examined ecological and socioeconomic aspects, offering fresh insights into their design evolution and historical significance. Luxembourg Gardens, dating back to the 17th century, blend royal aspirations and botanical art, becoming a cultural icon. In contrast, Tête d'Or Park, established in the 19th century under Mayor Claude Marius Vaiss, features a renowned rose garden, botanical sanctuary, and zoo, reflecting Lyon's heritage and commitment to species conservation. This comparative study highlights both parks' architectural and botanical elegance, as well as their vital roles as urban green spaces. Masterful landscaping and preservation efforts illustrate how these parks serve as biodiversity sanctuaries, landmarks, and community health emphasizing the importance of maintaining urban green infrastructure.

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1. INTRODUCTION

Urban parks are essential spaces for providing quality of life in cities, well-cared architecture, and thought-out design (Harutyunyan, 2023).

There are many reports regarding art, culture, and their preservation (see **Table 1**). Here, the present study examines these parks in terms of architecture and design, presenting implications for new development in Yerevan. This study sheds light on the complex organizational design process experienced by two well-known French parks while providing directionality for green space planning renaissance within Yerevan. Founded in 1612 by Queen Marie de' Medici, the Luxembourg Gardens are a mix of architectural styles and design elements. The Medici Fountain, built in 1620, reflects the aesthetics of the Italian Renaissance. Over time, the garden incorporated French formal garden elements such as geometric precision and strategically placed statues, including a replica of the Statue of Liberty. Architectural landmarks such as the ornate greenhouse and puppet theater enhance its cultural and historical significance, combining human creation with natural beauty.

Tête d'Or Park, created in the 19th century, was designed to bring nature to urban dwellers. Landscape gardeners Denis and Eugène Bühler, along with engineer Gustave Bonnet, created a park that integrates a renowned rose garden, a botanical garden, and a zoological park. A rose garden with over 16,000 rose bushes and a botanical garden reflects the region's horticultural heritage The design of the garden emphasizes the seamless integration of nature and man-made features, creating aesthetics and functional spaces for preservation and education.

Luxembourg Park and Tete d'Or do this beautifully, blending historic splendor with contemporary practicality through all its urban landscapes Well thought and intentional animal parks and open space schemes can help improve the quality of life in the city by providing green spaces to enhance public life and the environment stewardship.

Table 1. Previous studies relating to art, culture, and their preservation.

No	Title	Ref.
1.	Application of alum fixator for eco print batik making using a pounding	Lestari and Sakti
	technique in fine arts learning in junior high school	(2022)
2.	Strengthening literacy of cultural arts and crafts in the material of sculpture	Millatina et al.
	for 6th-grade elementary school students through learning video media	(2022)
3.	Exploring the rich tapestry of gardens and parks: A journey through history,	Harutyunyan (2023)
	education, and artistic expressions	
4.	Effect of weight exercise on the development of some components of	Kadhim (2023)
	special muscle strength and perform some artistic gymnastics skills	
5.	Titi Laras Damina educational for senior high school student as a form of	Herdian & Maryanti
	cultural preservation	(2023)
6.	Teaching preservation of kemojo cake (bolu kemojo) as a traditional cake of	Ashari <i>et al</i> . (2021)
	the Malay community of Riau Province	
7.	Lyrics of kawih tanah sunda by koko koswara as a media for learning cultural	Muliawati &
	literacy for students in junior high school	Maryanti (2022)
8.	The study of Muslim culture: basis for culturally congruent nursing	Organia et al.
	education	(20230

By studying these parks, urban planners in Yerevan can gain valuable insights into the multifunctional urban green spaces that adorn architecture, cultural heritage, and neighborhoods and the promotion of welfare in the garden Tête d'Or. It allows for a detailed examination of the architectural design elements observed in Tête d'Or Park, emphasizing

their importance and applicability to urban parks that will be held in Yerevan. Moreover, the study highlights the potential of these parks and gardens as a source of inspiration and information for upgrading urban green spaces in Yerevan city. By analyzing the progressive features and success techniques carried out in the Luxembourg Gardens and Tête d'Or Park, city planners, and stakeholders can benefit from treasured perception by enhancing the first-rate, functionality and cultural resonance of neighborhood parks. From promoting biodiversity to fostering cultural alternatives, these parks and gardens offer a blueprint for developing vibrant, sustainable, and culturally enriching city green areas for future generations. In 2023, within the scope of investigating the layout and compositional structure of gardens and parks in Yerevan, complete neighborhood research has been performed at Luxembourg Park in Paris, the capital of France, and Tête d'Or Park in Lyon, France. The exam encompassed an analysis of the evolutionary changes within the parks, regarding archival studies. Before delving into the effects of the study's excursion and its subsequent presentation, it's miles prudent to embark on an ancient overview. This excursion elucidates the founding, layout, and renovation records of each Luxembourg Garden and Park Tête d'Or.

2. METHODS

2.1. Study Sites

The study focused on two iconic urban parks: Luxembourg Garden in Paris and Tête d'Or Park in Lyon. These parks were selected for their historical significance, architectural styles, and exemplary landscape design. The Luxembourg Garden, established in the 17th century, showcases a blend of French formal garden elements and Italian Renaissance aesthetics. Tête d'Or Park, created in the 19th century, integrates extensive botanical and zoological collections with recreational spaces, reflecting Lyon's horticultural heritage.

2.2. Data Collection

The data collection involved a combination of archival research, on-site observations, and interviews with local experts and maintenance staff. Archival research included reviewing historical documents, maps, and previous studies related to the parks' design and evolution. On-site observations were conducted during the summer of 2023, focusing on the structural, compositional, and functional aspects of the parks. Detailed notes and photographs were taken to document the layout, vegetation, water features, and visitor amenities.

2.3. Archival Research

Archival research was pivotal in understanding the historical context and evolutionary changes of the parks. Historical documents, including design plans, maintenance records, and governmental reports, were examined. This provided insights into the original vision of the parks, subsequent modifications, and conservation efforts over time.

2.4. On-Site Observations

Field observations were conducted to assess the current state of the parks. This included mapping out various zones, identifying key architectural and botanical features, and evaluating the integration of natural and man-made elements. The observations were guided by predefined criteria focusing on landscape design, ecological features, and visitor amenities.

2.5. Interviews

Interviews with local experts, including landscape architects, horticulturists, and park maintenance staff, were conducted to gather insights into the operational and conservation

practices. These interviews provided valuable context on the challenges and strategies involved in maintaining the parks' aesthetic and ecological integrity.

2.6. Data Analysis

The collected data were analyzed to identify common themes and differences between the parks. A comparative approach was used to evaluate the design elements, historical evolution, and current management practices. The analysis aimed to highlight best practices and lessons that could be applied to the development and maintenance of urban green spaces in Yerevan.

2.7. Results Presentation

The findings were synthesized into comprehensive narratives describing the design and evolution of each park. The results highlighted the significance of historical context, meticulous planning, and ongoing maintenance in creating sustainable urban parks. Recommendations were made for urban planners and stakeholders in Yerevan, emphasizing the importance of integrating historical heritage, ecological balance, and community engagement in green space development.

3. RESULTS AND DISCUSSION

3.1. Inception and Royal Vision

Affectionately known as the Jardin du Luxembourg, the Jardin du Luxembourg stands today as a positive testament to the mixture of royal dreams, landscapes, and splendor in 1612, Queen Marie de Medici conceived of this green shrine, which royal landscape architect brought to life originally by the famous Tommaso Francini to become the focal point of the Luxembourg Palace Almost, thereby adding historical meanings to its lush expanse.

3.2. Architectural Evolution Through Centuries

Over the centuries, the Luxembourg Garden has passed through an incredible metamorphosis, reflecting the architectural and design sensibilities of diverse epochs. The Medici Fountain, an iconic centerpiece erected in 1620, emanates the sophistication of Italian Renaissance aesthetics amidst a meticulously deliberate environment. As the centuries opened up, the garden embraced the formal French style, marked using geometric precision, statues, and sculptures strategically placed to elevate the cultured revel. The 19th century saw the garden adorned with iconic statues, together with a notable replica of the Statue of Liberty, including a hint of creative grandeur.

3.3. Botanical and Architectural Gems

This gardening paradise is home to architectural gemstones that supplement the lush greenery. The richly decorated conservatory, which harmoniously combines architectural sophistication and natural beauty, is a testament to the harmonious integration of human introduction and the natural international. The huge swimming pool, reflecting the encompassing greenery, gives the landscape a reflective look, creating a tranquil environment. The mesmerizing puppet theater with its subtle grandeur brings a cultural size, presenting visitors with an immersive revel in that goes past conventional lawn aesthetics.

3.4. Cultural Resonance and Historical Tapestry

Beyond its picturesque attraction, the Luxembourg Garden resonates with cultural and historical importance. It has evolved into a living tapestry that weaves together the threads

of art, records, and nature. Writers locate the concept in its secluded corners, artists in its meticulous beauty, and site visitors in the undying elegance that envelops this inexperienced oasis. As a repository of historic opulence, it stands as a testament to Parisian grace, contributing to the cultural identity of the metropolis.

3.5. Landscaping as an Art Form

The Luxembourg Garden, with its carefully manicured lawns, elegantly trimmed hedges, and thoughtfully positioned statues, exemplifies landscaping as an art shape. The converting seasons orchestrate a symphony of colors and fragrances, turning each visit into a unique sensory enjoyment. The garden now not only captivates with its visual enchantment but additionally engages site visitors in an immersive journey through time and nature.

3.6. Preservation and Ongoing Legacy

Preserving the Luxembourg Garden is going past retaining its physical splendor; it includes safeguarding its ancient legacy and cultural resonance. As an image of botanical and architectural class, it continues to be an indispensable part of Parisian life. Its ongoing legacy displays a harmonious coexistence of the past and gift, in which visitors turn out to be part of a continuum - a shared experience that transcends time.

The park was mounted and is maintained not only as a place for endeavor and enjoyment but also as a monument of historic and cultural significance. It functions as numerous statues, busts, and monuments committed to well-known people. Additionally, the park homes a museum within its grounds. There are unique areas for scholars, college students, and site visitors, in addition to protecting posts and offices in the surrounding areas to facilitate the everyday operations of the team of workers. The park is designed as a cohesive complicated, integrating modern landscape design, city-making plans, and green areas.

3.7. The legend of the Tête d'Or Park.

Despite common assumptions, the name "La Tête d'Or" predates the establishment of the park by a significant margin. Legend has it that Crusaders once buried a treasure there, including a golden head of Christ. According to the tale, in 1855, efforts were made to locate this precious relic by hiring a clairvoyant woman. However, despite her best endeavors, she was unable to rediscover it. Whether legend or reality, to this day, the mystery of the golden head remains unsolved.

The creation of the park itself occurred in the 19th century under the direction of Lyon's prefect and mayor, Claude-Marius Vaïsse, with the intention of "bringing nature to those lacking it." Landscape gardeners Denis and Eugène Bühler, along with engineer Gustave Bonnet, were entrusted with its construction in 1856. The park opened in 1861, a year after work commenced. Subsequently, the zoological section and botanical garden were established in 1865 and 1887, respectively. A more recent addition, the rose garden, was introduced in 1961.

3.8. The golden rose

The park boasts a unique feature with its three interrelated rose gardens, a testament to the region's prominent role in the history of rose cultivation. The International Rose Garden spans over 5 hectares (12 acres) and showcases over 16,000 rose bushes representing 450 species. The Botanical Rose Garden chronicles the evolution of the rose flower with a collection of wild and historic rose bushes. Additionally, the Competition Rose Garden,

dedicated to the development of new varieties, serves as the venue for the annual International Contest of New Roses.

3.9. The botanical garden

The Lyon Botanical Garden serves as a vibrant living museum, preserving the rich diversity of plant life found across our planet. Nestled within the heart of both the park and the city, it stands as an oasis - a place for exploration, relaxation, and social interaction. Spanning 8 hectares (20 acres), including 6,000 square meters (7,150 square yards) of greenhouse space, the garden hosts a remarkable array of collections, featuring carnivorous plants, orchids, and passionflowers among others. With about 16,000 species housed inside its grounds, it boasts one of Europe's maximum good-sized collections, drawing admiration from professionals international.

As a member of the Conservatory of Specialized Plant Collections, several of its collections maintain the countrywide designation, together with the ones of the Araceae, Begoniaceae, and Bromeliaceae families. Moreover, the garden is ready with a library, herbarium, seed keep, and scientific hub, essential additives assisting its research and conservation efforts. Emphasizing environmental training for sustainable development, the botanical lawn gives a numerous variety of occasions in the year, consisting of school programs, workshops, exhibitions, and guided excursions tailored for the traffic of all ages.

3.10. The zoological park

In 2006, the Lyon Zoo, located within the Parc de los Angeles Tête d'Or, expanded its sights with an "African Plain" spanning almost three hectares (around 7 acres). This habitat hosts several species from the African savannah, coexisting within three wonderful environments: savannah, wetlands, and rainforest. Giraffes, zebras, Ankole-Watusis, lemurs, and other animals native to this biotope roam freely, providing visitors the possibility to examine them in a semi-natural setting. Beyond the sheer amusement of encountering an exotic natural world in the metropolis limits, this natural enclave serves academic and medical functions properly.

By recreating a sub-Saharan biotope, the zoo's objective is to elevate public awareness about the significance of maintaining the biodiversity of the African continent. Covering an area of eight hectares (20 acres), the zoological park is domestic to over four hundred animals, along with 149 mammals, 122 birds, seventy-one reptiles, and 1,000 crimson-eared sliders. Nearly half of these animals participate in European breeding programs, reflecting the zoo's club in the European Association of Zoos and Aquariums. As a result, the zoo performs a widespread role in species conservation efforts, actively encouraging breeding among its residents.

The numerous births of endangered species, such as giraffes, Amur leopards, Hartmann's Mountain zebras, blue-crowned Laughingthrushes, and red-bellied lemurs, serve as tangible evidence of these conservation initiatives.

3.11. On-site observations

In 2023, I conducted field observations within the Tete d'Or gardens situated in Lyon and the Luxembourg Garden in Paris.

It is imperative to underscore the esteemed status of these parks, recognized as pivotal hubs of historical and cultural significance within their respective cities. Hosting a multitude of events over time, both gardens have been subject to substantial investments by governmental bodies aimed at addressing architectural, design, aesthetic, and compositional

intricacies. These endeavors have been pivotal in modernizing and safeguarding these cherished green spaces. It is noteworthy that the maintenance and oversight of these parks extend beyond municipal authorities, with stringent state supervision reflecting the French Republic's steadfast commitment to environmental preservation and the continual enhancement of urban green areas.

Let me provide a detailed review of the structural and compositional solutions, as well as the installation and application details of these two gardens. This review includes observations and recommendations made by local experts and garden maintenance staff.

3.12. The Plan

In France, not only these two parks but all parks are designed with a clear and established plan, which is consistently used in all urban planning materials. These include maps posted on highways and in city information centers, as well as printed materials such as books, leaflets, and guides.

This culture is absent in Armenia, where parks are generally found only through Google Maps. There are a few exceptions for some larger parks, such as the Botanical Garden, Lovers' Garden, and English Garden, which have signs on adjacent streets.

3.13. Landscape

In France, as well as in urban gardens across various European cities, great attention is paid to landscape design. This goes beyond mere aesthetics; it involves maintaining, reshaping, and adapting the parks to their environment. The development of landscape solutions involves not only designers and architects but also biologists, ecologists, and other specialists in urban planning.

In both the Luxembourg Gardens in Paris and the Tête d'Or Park in Lyon, the park surfaces comprise a variety of elements. Alongside green areas and paved roads (either asphalted or stone-paved), there are sections with soil, sand, and water. This approach is not only beneficial from a design perspective but also creates a more natural environment for both people and animals.

3.14. Composition

Both of the gardens under investigation uphold strict adherence to their structural and design-architectural compositions, devoid of any deviations or distortions. Unlike several parks in Yerevan which suffer from compositional deficiencies, these parks maintain impeccable fidelity to their original designs.

There are no alterations to pathways, disruptions to the perspective of green spaces or plantings, or the introduction of symmetrical or temporary structures like reinforced concrete, concrete structures, semi-structures, or kiosks.

3.15. Discussion

The comparative evaluation of the Luxembourg Garden in Paris and the Tête d'Or Park in Lyon well-known profound insights into the evolution of city parks as cultural, ancient, and ecological landmarks. These meticulously crafted inexperienced sanctuaries stand as testaments to human ingenuity, art imaginative and prescient, and harmonious coexistence with nature.

Steeped in royal records and botanical art, the Luxembourg Gardens epitomize the blend of ancient majesty and contemporary aesthetics. From its beginnings under Queen Marie de

Medici to centuries of architectural architecture, this green space embodies the splendor and cultural rhythms of Paris. As an artistic record in nature, it holds on to captivate visitors with its timeless beauty and elegant majesty.

In evaluation, the Tête d'Or Park in Lyon emerges as a haven of biodiversity and ecological stewardship. From its legendary origins to its modern-day incarnation as a colorful botanical and zoological sanctuary, this park celebrates Lyon's rich horticultural legacy. With its internationally acclaimed rose gardens, botanical conservatory, and zoological park, it serves as a beacon of environmental training and species conservation, fostering a deeper connection between town dwellers and the herbal world. Through meticulous making plans, renovation efforts, and strength of mind for compositional integrity, each park exemplifies the transformative strength of inexperienced regions in city landscapes. As cities evolve and increase, the green sanctuaries feature essential refuges for biodiversity, cultural history, and communal well-being. Their enduring legacy underscores the significance of sustainable city planning, environmental stewardship, and the safety of inexperienced areas for future generations. In conclusion, the Luxembourg Garden and the Tête d'Or Park stand as shining examples of city park layout, in which history, way of life, and nature converge to create spellbinding landscapes that encourage, educate, and rejuvenate the human spirit. As cities navigate the complexities of urbanization and environmental sustainability, those green oases function as beacons of hope and resilience, reminding us of the intrinsic price of maintaining our herbal historical past amidst the bustling rhythms of present-day life.

The ability exemplified through those parks extends some distance beyond their borders, providing a beacon of concept and a blueprint for modernization to all forms of parks in Yerevan. Their splendid layout, meticulous plans, and dedication to safety characteristics are a guiding light for town green spaces attempting to evolve and thrive inside the present-day generation.

By studying the revolutionary capabilities and a hit technique implemented in the Luxembourg Garden and the Tête d'Or Park, city planners, and stakeholders in Yerevan can advantage of treasured insights into improving the exceptional functionality of close by parks. From incorporating several landscape elements to promoting cultural and ancient resonance, those parks show off the transformative energy of thoughtful design and strategic making plans.

Moreover, the cultural significance and ancient tapestry woven into the fabric of these parks offer a compelling narrative for parks in Yerevan to emulate. By embracing and celebrating local heritage, traditions, and herbal splendor, parks can transcend their position as mere leisure spaces to become vibrant hubs of network engagement and cultural change.

Furthermore, the sustainable practices and environmental tasks implemented in those parks underscore the significance of prioritizing ecological integrity and conservation efforts. From selling biodiversity to imposing green infrastructure solutions, parks in Yerevan can play a pivotal position in mitigating urban warmth island results, enhancing air first-rate, and fostering a deeper reference to nature among town residents.

Additionally, the economic benefits that come from well-designed and maintained parks can't be underestimated. As critical additives to a town's infrastructure, parks boost asset values, entice tourism, and stimulate local economies. By investing in the revitalization and modernization of parks, Yerevan can open up new possibilities for financial boom and community improvement.

In reality, the Luxembourg Gardens and Tête d'Or are dwelling testaments to the transformative capacity of city-inexperienced spaces. By taking proposals from their success tales and taking a holistic technique to park making plans and management, Yerevan has the

possibility to create parks that not only improve excellent of life but also enhance the cultural cloth of the metropolis for future generations (see **Table 2**).

Table 2. Luxembourg Gardens and Tête d'Or.

Description 1	Description 2
Recycle booth at Luxembourg Garden of Paris.	Easy to move chairs for the public at
	the Luxembourg Garden of Paris
Metal borders between sand and green areas at	Clothes hanger for the public at Luxembourg
Luxembourg Garden of Paris	Garden of Paris
Double-sided public chair at Luxembourg Garden	Composition of wood and sand areas at
of Paris	Luxembourg Garden of Paris
Informative signs at the Luxembourg Garden of	Landscape design at Luxembourg Garden of Paris
Paris	
Landscape design at Luxembourg Garden of Paris	Luxembourg Garden of Paris
Fitness Scale for the public at Luxembourg Garden	New designed green "island" between buildings at
of Paris	the center of Lyon city
Informative sign at Parc of Tete d'Ot of Lyon	Recycle at Parc of Tete d'Ot of Lyon
Sign at Parc of Tete d'Ot of Lyon	Security accessories at Parc of Tete d'Or of Lyon
Office building at Parc of Tete d'Or of Lyon	Parc of Tete d'Ot of Lyon

4. CONCLUSION

The comparative analysis of Luxembourg Garden in Paris and Tête d'Or Park in Lyon reveals their roles as cultural, historical, and ecological landmarks. These parks showcase human ingenuity and a harmonious relationship with nature. Luxembourg Garden, with its royal origins and artistic design, remains a symbol of Parisian beauty and history, while Tête d'Or Park is a hub for biodiversity and environmental education, reflecting Lyon's horticultural heritage.

Both parks highlight the importance of green spaces in urban landscapes, serving as refuges for biodiversity, cultural heritage, and community well-being. Their designs offer valuable lessons for the modernization of Yerevan's parks, promoting thoughtful planning, ecological sustainability, and cultural engagement. By learning from their success, Yerevan can enhance its parks, fostering environmental resilience, community connection, and economic growth for future generations.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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