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Urban Gardern for Green City: Comparison and Inspiration—Based on Asia, Europe and South America Cases

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Abstract

The design of urban gardens is of great significance for the construction of green cities. This article uses case analysis to compare the characteristics and advantages of typical green gardens in Asia (China and Japan), Europe (France), and South America (Australia) from four perspectives: culture and religion, vegetation characteristics, aesthetic elements, and funding. Based on the advantages and characteristics of green gardens in various regions, combined with current technological elements, propose some inspiring suggestions, including green roof technology application, environmentally friendly materials usage and community participation in garden maintenance. This article provides a broader perspective on the factors considered in urban garden design (green plants, garden routes, and small element planning) for different countries from the perspective of regional and cultural competitive advantages. Combined with specific cases, it provides a more detailed analysis perspective for carbon neutrality and sustainable development under the empowerment of technology in the 21st century.

Keywords: Green city; green gargen; case analysis; building design; carbon neutrality.

1. Introduction

Urban gardens play a pivotal role in the creation and sustenance of green cities (Cameron et al., 2012). It provides spaces for relaxation, recreation, and social interaction, fostering a sense of community and enhancing overall psychological well-being. Urban garden design usually aims to three keys: Climate adjustment(Tomatis et al., 2023), air quality improvement (Langemeyer et al., 2016) and psychological well-being(Velarde, M. & Tveit, M., 2007). First, urban gardern can regulate temperatures within cities by providing shade, evaporative cooling, and reducing the urban heat island effect through the presence of vegetation. Also, it alleviates extreme weather conditions by acting as natural buffers against winds, storms, and heatwaves. Second, urban garden can filter and purify the air by absorbing pollutants, such as carbon dioxide and particulate matter, while emitting oxygen, enhancing overall air quality in urban areas. Third, from perspective of pyschology, serene and aesthetically pleasing environments promote mental health and reducing stress among city dwellers. Based on these targets of urban garden designs, following factors are

naturally considered. 1)Greenery. In the plant section, plant species will be considered, including native vegetation, to ensure biodiversity and adaptability to the local climate. Besides, how to Incorporate a mix of trees, shrubs, and flowers for visual appeal and ecological balance is also essential. After that, planning for sustainable maintenance practices to ensure the longevity and health of the greenery should be the last but an important part. 2)Garden Pathway Planning. Creating meandering pathways that provide scenic views and a sense of discovery within the garden. 3)Small Element Planning. Choosing and integrating elements like fountains and sculptures harmoniously with the natural surroundings and architectural features. However, different cities within different continent may exhibit unique styles influenced by local cultures, climates, and urban planning philosophies when considering greenery, garden pathway and small element planning. The preferences and priorities in garden design can also reflect their zone advantages, from which comparison and inspiration can be especially valuable. This article will first introduce the characteristics and advantages of urban garden architecture in Asia, Europe, and South America, and then conduct a horizontal comparative analysis of them. Combining their respective advantages, inspiration for urban garden construction under the background of carbon neutrality will be proposed.

2. Description

2.1. Asia: china and japan

The nature garden landscape is the traditional style of urban gardens in China and Japan, which we can see from the Suzhou Gardens in China and the Shinjuku Gyoen National Garden in Tokyo, Japan. Typical elements of garden landscape include pavilions, stone bridges, flower walls, sculptures, plants (peach blossoms, pear blossoms, chrysanthemums, bamboos), and ponds . In terms of shape selection, China often chooses square and circular layouts (such as turrets with four sides and four corners), and likes harmony and symmetry. This is related to the traditional Chinese Taoist culture(Keswick, M., 2003). Taoist culture pays attention to “four righteousness and four corners” and “hiding the wind and gathering energy”. The selection of some animals also reflects the traditional culture of China and Japan. For example, turtle stones and crane stones are commonly used, which has the meaning of longevity. Meanwhile, there are also differences between Chinese gardens and Japanese gardens. For example, Japanese gardens are deeply influenced by Zen culture(Weiss,A., 2013). Zen Buddhism advocates that practitioners pursue a spirit of asceticism and self-discipline, so static elements such as evergreen tree species, sand, and stones are often used to create a lonely and simple garden artistic conception. In particular, when it comes to choosing stones, Japan prefers natural boulders. The ancestors of the Japanese archipelago believed in animism. In this kind of nature worship, the belief and worship of huge rocks or strange-shaped stones is particularly strong. To sum up, the style of Asian urban gardens is mainly nature garden landscape, which is influenced by Taoism and Zen thoughts. It mainly focuses on the theme of returning to nature and emphasizes the “unity of man and nature”.

2.2. Europe: france

Classical gardens are the style of French urban gardens. Influenced by the Renaissance, Italy, France, and England played an important role in the history of garden development from the 15th to the 19th century(Turkan, Z.& Köksaldı, E., 2021). The clever application of mathematical and geometric knowledge is mainly reflected in the design of classical symmetry and the arrangement of the main axis, such as the Palace of Versailles in France. Unlike the north-south axis of traditional palace style gardens in the East, Versailles adopted an east-west main axis, with a water sculpture with the theme of “Apollo” (as shown in the picture below) on the main axis, symbolizing that Apollo would drive his chariot to start sending light to humanity every day. In addition to the arrangement of the main axis, the most typical features include water feature canals, flower beds, tree lined roads, and magnificent decorations. These characteristics all reflect to a certain extent the ruling regime of monarchy(Weiss, A., 1995), as the Ambassador of Siam said in 1686, “Parks are the epitome of kingdoms, providing the monarch with the pleasure of perspective and perhaps even the pleasure of power through the interaction of extended paths and forests.” In summary, European urban garden styles, as long as they are classical gardens, are influenced by monarchy, represented by georgous

decorations, have a strong mythological and ornamental effect, and of course, the cost is also extremely high.



Figure 1. the Palace of Versailles

2.3. South America: australia

When it comes to urban gardens in Australia, it is inevitable to mention the Victoria State Library Garden located in Melbourne, Australia. It is the largest and oldest public library in Australia, as well as one of the earliest free public libraries in the world, with a neoclassical architectural style. It combines British and Australian local designs. The garden creates an environment where literature and nature blend through a combination of landscape, sculpture, and plants. In addition to the Victoria State Library Garden, the Royal Botanical Garden can also reflect the unique vegetation advantages of South America. Through organic layout and landscape design, it creates an ecologically rich and educational urban garden. Whether it's the Victoria State Library Garden or the Royal Botanical Garden, you can see the advantageous natural conditions and distinctive neoclassical architectural style of South America, which is also one of the advantages here.

3. Results

Based on the differential design of urban gardens in different states in terms of green plants, garden routes, and small object planning, we can see the stylistic differences brought about by the differences in climate, culture, and religion in different regions. The following table summarizes the differences from four aspects: religious culture, vegetation selection, aesthetic element composition, and funding issues. For example, from a religious perspective, the Asian region has been greatly influenced by Taoism and Buddhism, emphasizing harmonious coexistence between humans and nature. The European region has been greatly influenced by the Renaissance and Enlightenment movements, while South America has mainly been influenced by neoclassicism. These differences in religion and culture have laid the foundation for their urban gardens. From the perspective of vegetation, Asian countries prefer to use bamboo, peach, and pear trees, European countries prefer to use neatly trimmed lawns and green plants, and

South America tends to use local tropical plants. In terms of special elements, Asian countries prefer to use bridges, stones, ponds and other elements in their gardens, European countries prefer to use fountains and sculptures, and South American countries prefer to use neoclassical elements, such as columns and symmetrical structures. For funding, it needs to be analyzed based on specific circumstances, but European countries may involve some historical royal and aristocratic estates.

	Asia	Europe	South America
Religion and Culture	Buddhist principles, Taoist culture	Renaissance and Baroque styles	indigenous cultures alongside neoclassical influences
Vegetation	lush vegetation, including exotic plants and trees	manicured lawns and structured greenery	native plant species and vibrant, tropical flora
Aesthetic Elements	aesthetic elements such as water features, bridges, and rocks	statues, fountains, and architectural structures	Neoclassical elements, such as columns and symmetrical layouts
Varied Funding	come from a mix of public, private, and sometimes religious institutions, depending on the specific cultural context	often involves public or private investments, with some historically linked to royal or aristocratic estates	range from government initiatives to community-driven projects, often influenced by budget constraints and local priorities

Figure 2. The comparison amongs Asia, Europe and South America

4. Discussion

From the description and comparison in the previous statement, we can discover the characteristics and advantages of green gardens in different regions, some of which are advantages in vegetation and some are historical and cultural. With the development of modern technology, we can combine new energy, green and environmentally friendly materials, and sensor detection equipment to further transform and enhance these green gardens. For example, for the pavilions and towers preferred by Asian gardens, green roof technology can be used to improve energy efficiency; environmentally friendly materials can be used for restoration and maintenance of some ancient European classical gardens without compromising their integrity; we can encourage community participation in garden maintenance and fully utilize the characteristics of vegetation diversity in South American neoclassical urban gardens through the development of digital platforms or applications. Overall, the construction of green gardens can incorporate more technological elements for the sustainable development of green cities.

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