

# Construction of Multisensory Landscape and Integration of Soundscape, Smellscape and Lightscape in Traditional Chinese Gardens

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**ABSTRACT:** This paper proposes the concept of multisensory landscape construction, pointing out that people's perception and appreciation of a landscape is a process of overall impression and judgment formed with a combination of visual, auditory, olfactory, tactile, and even thermal and humid sense. Examples can be found in many famous traditional Chinese gardens. Around the West Lake area, there are famous soundscape scenic spots, e.g., Liu Lang Wen Ying (Orioles Singing in the Willows), Nan Ping Evening Bell (Evening Bell Ringing at the Nanping Hill), Zhejiang Qiu Tao (Autumn Wave of Zhejiang), and Jiu Li Song Tao (Wave of Pine Trees Lasts Nine Miles). There are also some famous lightscape scenic spots, e.g., San Tan Ying Yue (Moon and Candlelight Mirrored in the Lake) and Ping Hu Qiu Yue (Moon over the Peaceful Lake in Autumn). In terms of smellscape, in addition to the famous scenic spot Qu Yuan Feng He (Curved Yard and Lotus Pool in Summer), the West Lake area is also widely planted with osmanthus and other fragrant plants, forming a smellscape in which "late autumn is fragrant with osmanthus flowers and lotus in bloom for miles and miles." At Humble Administrator Garden, there are soundscape scenic spots such as Wu Zhu You Ju (Secluded Residence among Bamboo Bushes) and Liu Ting Ge (Pavilion to Pause and Listen); there are smellscape scenic spots such as the Orchid Field, the Magnolia Courtyard, the Panicum Pavilion, etc.; lightscape scenic spots such as Liu Ying Ge (Hall of Reflecting Shadows) and Ta Ying Ting (Pavilion of Shadow of Tower) can also be found there. In Chengde Summer Resort, there are soundscape scenic spots such as Wan He Song Feng (Wind of Ten Thousand Ravines and Pines) and lightscape scenic spots such as Xi Ling Chen Xia (Morning Sunset on West Ridge), etc.; smellscape scenic spots such as Qu Shui Hua Xiang (Fragrance of Flowers in the Curved Water) and Yuan Xiang Tang (Hall of Fragrance of Far Away) can also be found.

The above classic cases eloquently prove that the creation of multisensory landscape and the integration of them are the valuable experience in traditional Chinese gardens, which play an important role in the achievement of famous landscape.

Therefore, the design of landscape must pay attention to the creation and integration of soundscape, smellscape and lightscape. Another key point of the theory of multisensory landscape construction is that it is necessary to pay attention to both spatial and temporal dimensions so that the constructed landscape can be enjoyed everywhere and at all time periods. In this regard, the creation of the three-scape (specifically refer to soundscape, smellscape and lightscape) can also highlight their regional and temporal characteristics. By analyzing some classic cases of traditional Chinese gardens, this paper proposes that the construction of multisensory landscape and the integration of soundscape, smellscape and lightscape are the valuable experience in traditional Chinese gardens, which are also important for the achievement of famous landscapes and are excellent traditions that we should vigorously inherit and carry forward.

**KEY WORDS:** multisensory landscape construction; soundscape; smellscape; lightscape; Chinese traditional garden

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## 1 Background

Humans possess five sensory organs—eyes, ears, nose, tongue, and skin—responsible for functions of sight, hearing, smell, taste, touch, and temperature and humidity sensations separately, serving as channels for information exchanged with the external environment. It is inevitable that human perception of landscapes is mediated through these five senses, and the information received by these senses is complementary, then the human brain integrates this diverse information to formulate a comprehensive impression and judgment. This can be termed as the process of perceiving a multisensory or holistic landscape. Notably, information received through vision, hearing, and smell is particularly crucial in this process. However, contemporary landscape theories tend to overly focus on visual landscape while neglecting the impact of hearing, smell and touch on landscape perception. Simultaneously, among visual landscapes, the lightscape which is constituted by the light sources and the variations of light and shadow, has not been given particular attention as a unique type. These absences lead to significant deficiencies in landscape planning, design and construction, and consequently diminish people's ability to perceive landscape in their entirety and appreciate their aesthetic qualities fully.

To enhance the quality of living environments, especially the quality of landscapes such as scenic gardens, to better meet the public's demand for high-quality landscapes, to further develop a beautiful China, preserve nostalgia, and create landscapes with national, local and cultural characteristics, and to prevent the pitfalls of a monotonous array of scenes, it is necessary to strengthen research and practice in the theories of multisensory landscape, including soundscape, smellscape, and lightscape. It is essential to advocate for the enhancement of the creation and integration of the three aspects of sound, smell, and light in

landscape design and implementation.

## 2 Concept of the three-scape and the construction of multisensory landscape with the integration of soundscape, smellscape and lightscape

### 2.1 Soundscape

The concept of "Soundscape" was formally introduced by the Canadian scholar Schafer in the 1960s. The International Organization for Standardization defines "Soundscape" as the auditory environment perceived by individuals, groups, or communities within a given setting. This definition reveals that Soundscape studies focus on both the objective sonic environment and the subjective experience of individuals in the environment. This differentiation is what distinguishes soundscape studies from traditional environmental acoustics. Traditional environmental acoustics primarily concentrates on the objective aspects of the acoustic environment, emphasizing the physical properties of sound waves and their impact on individuals. However, as sound waves serve as carriers of information, the content they convey plays a significant role in individuals' perceptions of sounds, which can vary depending on the listener's social identity and experiences. Additionally, sounds such as music and language possess aesthetic qualities. Therefore, soundscape studies offer a broader and more comprehensive examination of the relationship between the acoustic environment and individuals, as well as society. Soundscape studies view sound as a resource to be utilized, focusing on the use of pleasant sounds that people enjoy listening to in order to create a pleasant acoustic environment while masking the disturbances caused by noise. Soundwalk, as a form of landscape appreciation, provide an innovative way for people to enjoy and explore landscapes.

Although soundscape studies have only been formally introduced for over half a century, ancient China had long recognized the phenomenon and appreciation of soundscape. It has been observed that 28% of the content in the Book of Songs (Shijing) is related to soundscape, with many poems directly titled after soundscape. The Book of Songs also introduced numerous onomatopoeic

words to describe various natural sounds and human social sounds that people enjoy hearing [1]. Ancient Chinese gardens also placed significant emphasis on the creation and appreciation of soundscape.

Soundscape exhibits distinct regional and temporal characteristics. For instance, the sound of tides can only be heard near coastal areas; the sound of the Qiantang Autumn Tide in Hangzhou can only be appreciated near the Qiantang River during the autumn when the Qiantang Tide occurs; various bird songs and insect chirps can only be heard in different locations and seasons, such as the clear examples of summer cicadas and autumn crickets. Therefore, the creation and appreciation of soundscape are inherently characterized by distinctive regional and temporal traits.

## 2.2 Smellscape

A "Smellscape" refers to the landscape experienced by the sense of smell. The term "Smellscape" is chosen in this paper to emphasize a positive and health-enhancing olfactory environment that is pleasant for people to smell, thus representing the essence of a fulfilling olfactory environment. The concept of "Smellscape" was formally introduced by another Canadian scholar, Porteous, in the 1980s. However, ancient China has long recognized the creation and appreciation of smellscape. The Book of Songs (Shijing) also extensively mentions various fragrant plants, including plum blossoms, phoenix trees, campsis grandiflora, Sichuan pepper, daylily, wormwood, lotus, orchids, peonies and aromatic turmeric root-tuber. In traditional Chinese garden design and construction, fragrant plants have always been considered as an important element of garden landscape, representing important virtual scenes and memory-landscape to create the "beyond-reality" ambiance of gardens. Smellscape play an irreplaceable role in shaping and perceiving garden spaces. Like soundwalk, smellwalk serves as a new way to appreciate landscapes.

Smellscape also exhibit distinct regional and temporal characteristics. Different fragrant plants grow in varying geographical and climatic environments, giving them distinct regional characteristics. Additionally, different fra-

grant plants bloom and emit fragrance in different seasons. For instance, spring peaches, summer lotuses, autumn osmanthus and winter plums represent typical flowers of the four seasons, highlighting the distinct temporal characteristics of smellscape.

## 2.3 Lightscape

A "Lightscape" refers to a landscape primarily composed of light sources, light and shadow, and their variations, or a landscape that evokes strong visual impressions by the interplay of light sources, light and shadow. A lightscape formed by natural light sources is called a natural lightscape, while one created by artificial light sources is referred to as an artificial lightscape. There is also composite lightscape that combine both natural and artificial light sources. As a distinct type of visual landscape, the concept of "Lightscape" was proposed by the author of this paper in recent years [2]. The inspiration for introducing the concept of lightscape was drawn from the Book of Songs (Shijing). While researching soundscape in the Book of Songs, the author discovered numerous descriptions of illumination phenomena, including references to sunlight, moonlight and starlight as natural illumination, and firelight, lamplight as artificial illumination. Drawing parallels from the concepts of soundscape and smellscape, the concept of "Lightscape" was conceived. Traditional Chinese gardens also place significant emphasis on the creation and appreciation of lightscape. Like soundwalk, lightwalk should be advocated as a novel way of experiencing landscape leisurely.

Similar to soundscape and smellscape, lightscape possess distinct regional and temporal characteristics. For instance, the appearance of a mirage is related to specific geographical locations, geophysical conditions and climate conditions. Thus, it is more likely to occur in places like Chang Island, Penglai, and Huilai. The phenomenon of the aurora borealis exemplifies this concept. The sighting of firefly lightscape is only possible in areas with abundant vegetation and good ecological conditions; furthermore, the cyclical movements of the sun and moon, the rotation of stars and the ever-changing clouds exhibit clear tempo-

ral characteristics.

## 2.4 Creation of multisensory landscape and integration of the three-scape

This paper introduces the concept of creating multisensory landscape, focusing on two key points. Firstly, it advocates that people's perception and appreciation of landscapes are formed by the synthesis of various elements, including visual, auditory, olfactory, tactile, and thermal-humidity sensations; thus, landscape creation must consider satisfying the sensory experiences and needs of individuals in terms of vision, hearing, smell, taste, and bodily sensations. Among these, the elements of sight, sound, and smell are particularly indispensable. Therefore, promoting the creation and integration of soundscape, smellscape and lightscape is one of its core components. Secondly, the creation of landscapes must consider both spatial and temporal dimensions, ensuring beauty everywhere and at all times [3]. Soundscape, smellscape and lightscape all possess distinct regional and temporal characteristics; thus, they can play pivotal roles in landscape creation with these two dimensions.

Introduction of the concept of "Multisensory Landscape" and the integration of the "Three-scape" explore a new approach to enhancing the quality of human living environment, particularly the quality of landscape. In the existing studies, we have observed that renowned classical Chinese garden landscapes, in addition to well-designed architectural and natural landscape, also incorporate diverse elements of sound, fragrance and light, presenting rich sensory experiences for sight, hearing, and smell. They achieve the integration of the three-scape by providing diverse information and eliciting aesthetic satisfaction from various perspectives, consequently constructing healthy landscape that evoke nostalgia. Below, we will further elaborate on this concept by several exemplary classical Chinese garden landscapes that excel in the creation of multisensory landscape and the integration of the three-scape.

## 3 Classic cases of multisensory landscape creation and integration of the three-scape in Chinese classical gardens

### 3.1 West Lake, Hangzhou

West Lake in Hangzhou is a renowned scenic spot in China that has long been referred to as a paradise in the old saying "up above there is paradise, down here there are Suzhou and Hangzhou." The widespread acclaim and enduring fame of West Lake can be attributed not only to its exceptional natural and architectural landscapes but also to its emphasis on the creation of multisensory landscapes that integrate the three senses of sound, fragrance, and light. In West Lake, there are famous soundscapes such as the Orioles Singing in the Willows (Figure 1) and the Evening Bell at Nanping, where visitors can appreciate the natural and cultural soundscapes of bird songs and temple bells. Historically, there are renowned soundscapes like the Autumn Sounds of Zhejiang and the Nine Miles' Sounds of Pines, which are part of the Ten Views of the Qiantang River [4,5], for visitors to listen to the natural sounds of Qiantang waves and pine winds. In terms of light, West Lake features prominent lightscapes like the Three Pools Mirroring the Moon and the Autumn Moon over Pinghu Lake. Among these, the Three Pools Mirroring the Moon is a creatively designed lightscape where three stone pagodas were built on the lake (Figure 2), each with a hollow belly and five evenly spaced circular holes in their spherical bodies; on moonlit nights, thin paper is pasted on the holes, and lamps are lit inside the pagodas; the bright moonlight is reflected on the lake surface through the holes, creating multiple images of the moon, a captivating sight celebrated as the "Top Scenic Spot of West Lake." The Autumn Moon over Pinghu Lake is another famous moon-watching site. From August 14th to 16th each year, the Mid-Autumn Moon Viewing event is held at Pinghu Lake, making it a traditional and picturesque experience to admire the beauty of the autumn moon at West Lake. In terms of smellscape, apart from the famous Qu Yuan Fenghe, one of the Ten Views of West Lake (Figure 3), which lets visitors to smell the fragrance of lotus flowers, West

Lake also plants osmanthus and other fragrant plants to create a delightful scene known as the "Osmanthus in Autumns and Lotus Flowers for Ten Miles," a subject of praise by renowned poets such as Liu Yong. It is evident that the creation and integration of the three-scape contribute to the continuous allure and international fame of the West Lake landscape, making it a shining symbol of beauty both at home and abroad.



Figure 1 Orioles Singing in the Willows, West Lake



Figure 2 Three Pools Mirroring the Moon, West Lake



Figure 3 Qu Yuan Fenghe, West Lake

### 3.2 Humble Administrator's Garden

Representing classical gardens in Suzhou, the Humble Administrator's Garden (Figure 4) also places significant emphasis on the creation and integration of the three-scape. In the Humble Administrator's Garden, there are soundscapes such as the Wuzhu Youju (secluded dwelling between phoenix trees and bamboos), Ting Songfeng Chu (pavilion for listening to the wind among pines), Ting Yuxuan (pavilion for listening to the rain) and Liutingle (pavilion for lingering sounds), for visitors to appreciate the soothing sounds produced by the wind and rain interacting with various vegetation, such as the melodies of bamboo and pine, and to experience the artistic conception of "listening to the raindrops on withered lotus leaves." In terms of smellscape, there are scenic spots like Yuanxiang Tang (distant fragrance hall), Lanwan (orchid garden), Yulanyuan (magnolia courtyard), Shuxiang Guan (millet fragrance house), Xuexiang Yunweiting (pavilion of snow fragrance and cloud elegance), Shanghe (appreciating lotus) and Haitang Chunwu (spring lodge of begonia), where visitors can enjoy the scent of orchids, magnolias, plums, lotuses, and begonia flowers blooming in different seasons. Regarding the lightscape, there are points of interest like Daoyinglou (reflection tower) and Tayingting (pavilion of tower shadow), where visitors can observe the reflections and light variations on the water, as well as Linglongguan (exquisite pavilion) that lets people to appreciate the interplay of moonlight in the bamboo grove, creating a captivating scene known as "moonlight penetrating the green bamboo, elegant and exquisite." It is the harmonious integration of the three-scape and the diverse offerings in these aspects that have contributed to the Humble Administrator's Garden earning its reputation as one of the Four Great Gardens of China.



Figure 4 Seasonal changes in the Humble Administrator's Garden (from left to right: spring, summer, autumn, winter)

### 3.3 Chengde Mountain Resort

Chengde Mountain Resort, another famous scenic garden and resort area listed among the Four Great Gardens of China, exemplifies the importance of integrating and showcasing the three-scape experiences (Figure 5). In terms of soundscape, the resort features scenic spots such as Wanhe Songfeng (pine winds in countless valleys), Fengquan Qingting (clear springs with the sound of wind), Yingzhuan Qiao Mu (singing birds among tall trees) and Nuanliu Xuanbo (warm streams with bustling waves), for visitors to appreciate the sounds of pine rustling, spring water flowing, waves crashing and the melodious singing of yellow warblers. Regarding the smellscape, Chengde Mountain Resort offers scenic spots like Qushui Hexiang (fragrance of lotus on winding waters), Xiangyuan Yiqing (fragrance spreading far and wide), Lihua Ban Yue (pear blossoms under the moon), and Jinlian Yingri (golden lo-

tus reflecting the sun).

In terms of the lightscape, the resort provides scenic spots such as Xiling Chenxia (morning glow over the Western Ridge), Chuifeng Luozhao (setting sun behind the Hammer Peak), Yunfan Yuefang (moonlit cruise under the clouds) and Changhong Yinlian (rainbow drinking over the river), for visitors to observe phenomena like morning glow, sunsets, clouded moons and rainbows. The aforementioned sites of Qushui Hexiang, Lihua Ban Yue and Jinlian Yingri are examples of spots that combine soundscape, smellscape and lightscape. Moreover, the Moonlight and River Sound spot on Golden Mountain Island is a prime example of the fusion of soundscape and lightscape. It is evident that the integration and completeness of the three-scape have played a crucial role in establishing Chengde Mountain Resort as a renowned and significant destination in the realm of scenic gardens and resorts.

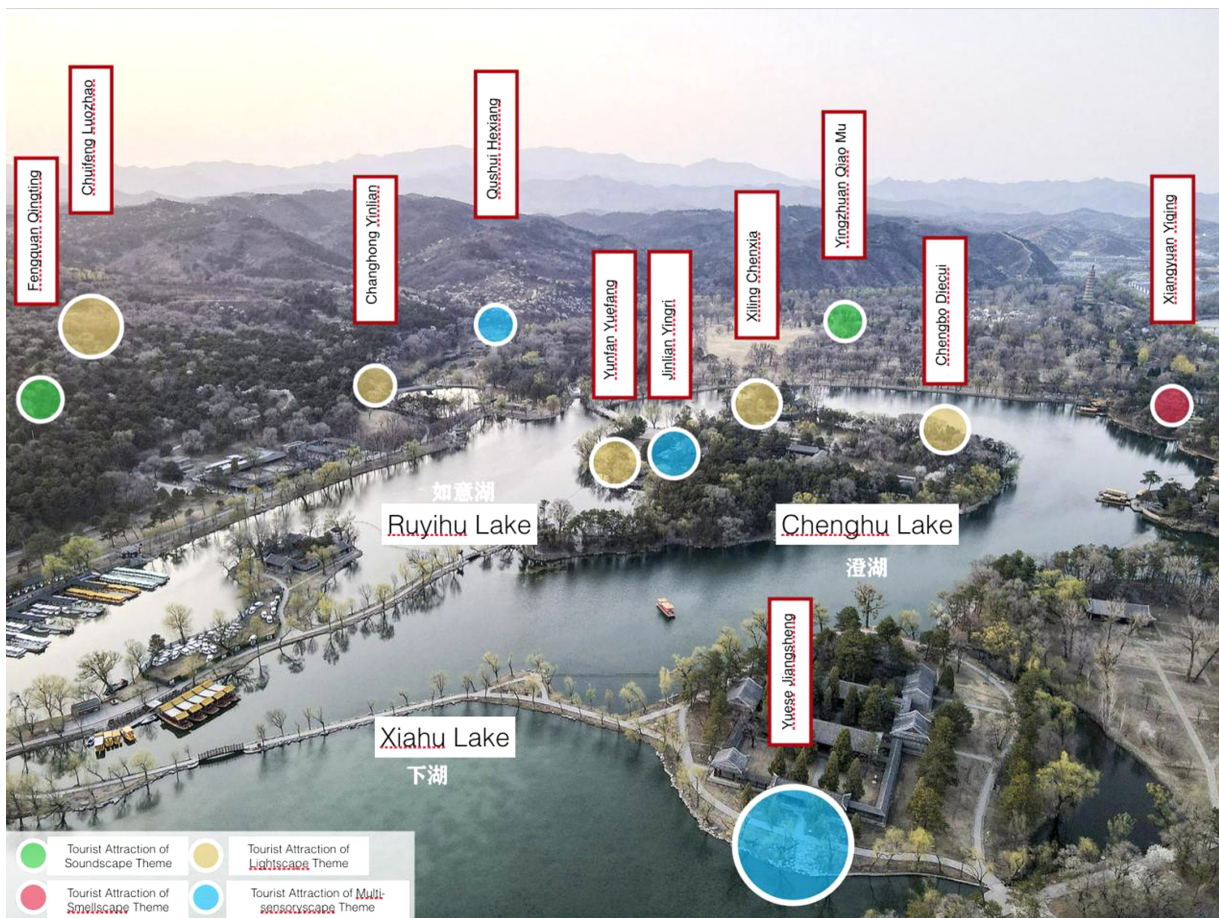


Figure 5 Schematic diagram of some tourist attractions of soundscape, lightscape and smellscape in Chengde Mountain Resort

#### 4 Conclusion

This paper introduces the concept of creating multi-sensory landscape and emphasizes that people's perception and appreciation to landscapes are formed with the synthesis of visual, auditory, olfactory, tactile, thermal and other sensory inputs, leading to an overall impression and judgment process. Among these, visual, auditory, and olfactory information are particularly crucial and indispensable. Therefore, the design and construction of landscape must prioritize the creation and integration of sound, fragrant, and light aspects. Another key aspect of the theory of creating multisensory landscape is the simultaneous consideration of both spatial and temporal dimensions of landscape, ensuring that the constructed landscapes are consistently appealing in all places and at all times. In this regard, the creation of the three-scape can also highlight the regional and temporal characteristics of landscape. Traditional modern landscape theories often overly emphasize visual landscape as well as spatial dimension, neglecting the construction of soundscape and smellscape, as well as lightscape, the particular aspect of visual landscape, and overlooking the temporal dimension, leading to significant shortcomings in landscape creation. Therefore, the introduction of the theory of creating multisensory landscape, with a focus on the creation and integration of the three sensory (visual, auditory, and smell) experiences, represents a significant improvement in the quality of living environment, particularly in landscape quality, exploring a new access and perspective. This concept holds important guiding principles for further developing

a beautiful China, preserving nostalgia, especially in the construction of gardens, tourist areas, distinctive towns, and beautiful rural areas. Based on the analysis of several classic Chinese traditional garden cases, this paper eloquently proves that the creation of multisensory landscape and the integration of the three-scape are valuable experiences in traditional Chinese gardens. They play a crucial role in the creation of famous landscapes and should be vigorously inherited and promoted as an excellent tradition.

#### Figure and table sources

Figure 1 and 3: <http://www.5a4a3a.com/hz.htm>.

Figure 2: <https://kknews.cc/travel/p5vknez.html>.

Figure 4: <https://www.meipian.cn/2vyl4vpd>.

Figure 5: The image is processed by the author based on the picture from [http://www.bishushanzhuang.com.cn/index.php/scenic/pic\\_list/id/39.html](http://www.bishushanzhuang.com.cn/index.php/scenic/pic_list/id/39.html).

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