

The Application of Soundscape in Environmental Art

Wanlin Wang^{1,*}

¹Shanghai Academy of Fine Arts, Shanghai University, Shanghai, China

*Corresponding author. Email:762390163@qq.com

ABSTRACT

Sight, hearing, smell, touch and taste are the main factors that constitute people's feelings in environmental art design, but auditory elements are often ignored by designers. Auditory elements are just like cooking wine, which is not the main body of a dish, but can enhance the overall flavor of the dish when used properly. Through the review of ancient and modern environmental art in the representative soundscape application case, this article studies the soundscape in the role of environmental art design. The value of studying the application of soundscape in environmental design is not reflected in a specific project design, but helps to improve the overall quality of human living environment.

Keywords: *soundscape, environmental art, environmental design*

I. INTRODUCTION

In the long-term development process of environmental art design, its design style is becoming more and more diversified, at the same time, its function also highlights the characteristics of humanization, which is different from the visual feeling of only considering color, space, layout and so on; now people pay more and more attention to the multi-sensory experience in the space environment. Because of the comprehensiveness of human sensory experience, besides vision, hearing and touch have gradually become the concerns of designers.

Hearing is the auditory nerve impulse caused by the ear under the action of sound waves, and it is an important organ for people to receive external information. Because of the direct effect of sound on people's psychology, many environmental art designers integrate the natural sound or man-made music into the urban environment by soundscapes. The value of studying the application of soundscape in environmental design is not reflected in a specific project design, but helps to improve the overall quality of human living environment.

II. DEFINITION OF SOUNDSCAPE

The concept of soundscape appeared in the 1960s. The International Organization for Standardization (ISO) defined soundscape as the sound environment perceived, experienced or understood by individuals, groups or communities in a given scene [1]. Different from environmental noise management, soundscape pays attention to people's perception and feeling of sound. It pays attention to the positive side of sound environment, strives to reduce the impact of negative

sound on people's life and psychology, and regards sound as a resource rather than "waste"[5].

For example, in environmental noise management, all environmental sounds are regarded as the same resource, but in soundscape design, environmental sounds are resources that need to be classified. Environmental noise management is to measure the overall sound decibel and manage the sound from the physical, while soundscape design needs to distinguish the sound source and focus on using the sound that has a positive effect on people (psychological and physiological aspects) and the environment to cover up the sound that will have a negative impact on people and the environment[6].

III. APPLICATION OF SOUNDSCAPE

Although the concept of soundscape was not put forward until the 1960s, people had already used soundscape before that. In the design of Chinese classical gardens, although the landscape designers did not regard sound environment and visual environment as the same status, they also began to incorporate sound into the environmental design of gardens very early [2], such as Dongshan in Yangzhou Garden.

Dongshan in Yangzhou Garden is a group of white-top quartzite rockery built against the wall ("Fig. 1"). The white top of these quartz stones are like snowdrifts. Visually, it creates a scene that the snowdrift shines when the sun shines, and white when it is backlit in cloudy days. It is combined with twenty-four Wind Sound Holes ("Fig. 2") to simulate the howling wind in winter. It gives people the feeling that ice and snow are not gone.



Fig. 1. Dongshan, Yangzhou Garden.



Fig. 2. Dongshan, Yangzhou Garden.

Ancient Chinese literati abandoned themselves to nature and pursued "harmony". In addition to the unique soundscape of "Dongshan" in Yangzhou Garden, there are also a large number of soundscapes using the sound of rain and water. In *yuanye*, a Chinese masterpiece of ancient garden design, there are many descriptions of the sound of rain in the garden, such as "At night, the rain hit the leaves sound like the little pearls falling on a ceramic plate."

There is a couplet in the Chengqu Thatched Cottage of Suzhou Coupling Garden: Lying on the rocks, listening to the wind blowing through the pine forest, like the sound of waves, clothes also seem to stick to the green color. Opening the door to watch the rain, I heard the sound of the rain hitting the leaves. These sentences vividly describes how Chinese ancient garden designers further created and enhanced the elegance

and interest of gardens through sound (the sound of wind, water, trees, birds and insects, etc.).

Not only in China, but also in Japan, the Shishi-doshi (ししおどし) in the courtyard ("Fig. 3") is also an application of soundscape. Shishi-doshi is a common prop in Japanese courtyards, through the lever principle, using running water at both ends of the bamboo tube constantly transfer, so that the bamboo tube like a seesaw at both ends of the base, thus issuing a clear knock. In that past, the Shishi-doshi was use as a functional appliance for scaring birds, wild deer, wild boar and other animals straying into the courtyard through a clear knocking sound, but with the passage of time, the Shishi-doshi gradually becomes a courtyard landscape. the clear bamboo tube knocking sound of the Shishi-doshi is matched with the gurgling running water sound to scare the birds in the courtyard and also enhance the Zen of the courtyard.



Fig. 3. Shishi-doshi (ししおどし).

In modern environmental design, soundscape is often a means for designers to create places, such as the earpiece of Shiruku Road Sensory Park in Japan ("Fig. 4"). Shiruku-Road Park has many special sound installations, some in the forest, some close to the ground, some near the water.



Fig. 4. Shiruku-Road Park.

They are used to collect all kinds of natural sounds in the park in real time-bird song, insect song, water murmur, leaf friction sound, etc. One end of the device is used for collecting various sounds in the natural environment, and the other end is used for enabling people to listen to the collected sounds, so that people relax in the process of listening to the nature, and the interaction between people and the nature is improved.

The sound source of soundscape is mainly divided into two kinds, one is natural sound source, the other is artificial sound source. Natural sound sources include birds chirping, insects chirping, dogs barking, water running, rain ticking, wind blowing leaves, etc. The above three sound landscape cases use natural sound sources. Artificial sound source refers to the sound processed by artificial artistry, such as the music sound

of musical instruments, the evening bell of temples and the water sound of artificial waterscape. In modern cities, the sound landscape also use artificial equipment to imitate the sound of nature, or create the sound of art.

The Spanish water curtain device, the water curtain veil ("Fig. 5"), is one of the soundscape works that integrate artificial sound sources with natural sound sources. The designer makes full use of the characteristics of water, visually utilizes the reflectivity and transparency of water, creates a water curtain screen connecting light and shadow with the surrounding environment, integrates the natural flowing stream sound with the ticking artificial water curtain sound in hearing, and shapes the environmental atmosphere with artificial soundscape and natural soundscape.



Fig. 5. Spanish water curtain device.

In addition to creating the environment atmosphere, adding auditory elements in the environment design can also effectively strengthen people's memory feelings for the space environment, therefore, rational use of auditory spatial memory characteristics, but also for the visually impaired to provide special services [3]. Denmark Pinstrup Disabled Children's Education Center uses the sound difference of different plants in the wind in the design of public activity area to help visually impaired children accurately locate their position in the public activity area, and provide them with invisible space location guidance, which is also conducive to the psychological establishment of self-confidence of visually impaired children.

IV. TECHNIQUES OF SOUNDSCAPE

In environmental design, soundscape has the function of enriching environmental elements and purifying environmental noise in addition to creating environmental atmosphere [4]. The design method of soundscape can be divided into zero-design, positive design and negative design. Zero design refers to the design method of maintaining and continuing the existing sound without any artificial modification of the sound. The aforementioned earpiece device used in

Shiruku-Road Park in Japan is a zero-design approach. The natural sounds in the environment are not artificially processed, and only the sound is amplified through the earpiece device.

In order to enhance the richness of environmental auditory experience, the positive design adds new sound elements on the basis of retaining the original sound landscape, so as to enrich the auditory experience of viewers. For example, the sound landscape space work Listening Garden ("Fig. 6") in Shangdu, Zhujiajiao, Shanghai, is not only a special way of music performance, but also an interactive sound landscape space. Viewers stand in the garden to watch the performance, which is performed in a four-sided enclosure way, through the performance and walking of the performers, to guide the movement of the audience's sight.



Fig. 6. Listening Garden.

Common positive design techniques in life include the installation of classical music speakers on the grass in the park to create a peaceful and relaxing environment; the bronze bells in the Buddhist temples and the wind chimes hanging on the four corners of the eaves of ancient buildings play the time and alarm. While walking the bird and other functions, the sound that echoes far and away also enhances the sense of etherealness of the ancient temple.

Negative design refers to the removal of auditory elements that affect the auditory experience of the overall space environment in the original landscape environment. This design technique can purify the negative sound environment. The ridge-like green belts on both sides of the park runway of Amsterdam Airport Schiphol in the Netherlands ("Fig. 7") combine landscape art, land art and scientific and technological achievements. The three-meter-high ridge-like strip dike is perpendicular to the sound wave source, which can better block the take-off and landing of aircraft. The noise generated by the time, and the one-meter-wide small road interspersed in it becomes a walkway for neighboring residents.



Fig. 7. Amsterdam Airport Schiphol in the Netherlands.

The stainless steel carving Blade in Schiff Square ("Fig. 8") near Sheffield Railway Station is also a negative design technique. One of the classic cases. Inspired by the history and culture of Sheffield's iron and steel civilization, the sculpture is both a water feature and a soundscape.



Fig. 8. Blade in Schiff Square.

After World War II, the developed countries in Europe and the United States began to experience industrial transformation, the original prosperous central city began to decline, and urban renewal came into being. Schiff Square, as the station gateway of Sheffield City, is close to the Cultural Industry Zone, Sheffield Bus Transfer Station and Sheffield Hallam

University, and is inevitably facing renewal. The biggest problem faced by the square in the transformation is how to solve the traffic noise from its adjacent urban main road.

The designers solved this problem by using flowing water and an 80-ton steel artwork, the Blade, which is a barrier to traffic noise on one side and a treated

disinfectant water flowing down the steel skin on the other side of the square, providing people with light and fast water sound while further masking traffic noise.

V. SOUNDSCAPE IN NATURE

The sound landscape is not the original creation of human beings, and there are also a large number of naturally formed sound landscapes in nature. The Wuyishan Tiger Roaring Rock Scenic Area ("Fig. 9") located at the junction of Jiangxi and Fujian provinces in China is a naturally formed sound landscape. Whenever the mountain wind blows through the natural giant cave on the rock, it will make a sound similar to the tiger's roar, which is the origin of the name "tiger's roar".



Fig. 9. Wuyishan Tiger Roaring Rock Scenic Area.

VI. CONCLUSION

Auditory elements can be a good auxiliary visual elements of the function and expression, the study of sound scene in the application of environmental art design, help to create a more healthy living environment, the traditional environmental art design excessive focus on the visual elements of the design and expression, ignoring the other senses to people's psychological and physiological impact, but with the development of the times, People's overall requirements for the quality of living environment have been further improved. Modern environmental art design should start with human care, further coordinate the communication between people and nature, people and the environment, and improve the overall quality of living environment in many ways.

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