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New Technology Creates New Lightscape

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ABSTRACT

Light is a key element of our world's beauty. Chinese scholar Wu Shuoxian put forward the concept of "Lightscape", and proposed its research as a parallel discipline of the "Soundscape". As a special aspect of the visual-scape, lightscape can give us a comprehensive and multi-disciplinary perspective of living environment. Many traditional lightscape cases have always been remembered as the representations of specific regional cultures. This article presents several cases of modern lightscape created with new technologies and methods. Included in these cases are: outstanding lightscape and art installments created by artists using light as a key element and fulfilled with the help of new materials; preservation of nostalgia by transforming and flourishing the traditional lightscape; multidisciplinary cooperation where artists, scientists and engineers use digital technology and biology knowledge to create intriguing lightscape.

KEYWORDS

Lightscape Lighting technology creation

INTRODUCTION

The concept of lightscape, put forward by the Chinese scholar Wu Shuoxian as a special aspect of visual-scape, refers to the special visual-scape that utilizes light source, shadow and their transformations to form landscape and to invoke strong visual impression. We advocate it as a parallel discipline of "soundscape" and "smellscape", so that it can play an important role in inheriting human culture and creating a human habitation for a better living (Wu Shuoxian, 2017) .

Since antiquity, the significance of light has gone beyond the practical level of delivering information. As a unique aspect of visual-spect, lightscape has specific records and meanings in various cultures. Historically, there was appreciation of the natural lightscape as well as the description of artificial light-based scenery. For instance, in China, the torch festival in minority areas is originated from primitive times ceremonies where the laboring people commemorated the harvest. The Lantern Festival, began at Han Dynasty, celebrates the first full moon night of the New Year. actually, the whole human-world has been creating wonderful lightscapes for thousands of years. This paper aims to tell that, with the help of new technology and its application, creative artificial lightscape will emerges constantly.

1. NEW LIGHTSCAPES AROUND THE WORLD

Human's beauty-love instinct is global. Civilization has been given new connotation by the developing science. Wonderful lightscape works supported by new technologies amaze people all over the world.



Fig.1 Light Show, Giza, Egypt
picture taken from:
<http://www.nipic.com>

1.1 Breathtaking light shows

There are light shows coming forward in well-known cities and famous scenic spots around the world. Compared to traditional performance, those emphasize more on the combination of light, shadow and other medias, with the addition of various means including music and installation art, to give a comprehensive sensory experience to live audiences.

Light and Sound Show of the Pyramids The Light and Sound Show in the Giza region, Egypt, uses dramatic narration means to present the tales of pyramids, the sphinx and influential persons. During the show, lasers are projected on the pyramids to form the shapes of inner structures, along with explanations. Accompanied by a mysterious voice that seems to come from ancient times, lights are cast on the pyramids making diversiform shadows. This hour-long show tells the story of ancient pharaohs in such a vivid way, that the audiences indulge in it as if they have taken an journey through the time.

Dame de Cœur of Notre-Dame De Paris To mark the centenary of the end of the first world war, Notre-Dame De Paris dedicated the "Dame DE Coeur" 3D sound and light show directed by Bruno Seillier in November 11, 2017. In virtue of the touching story of a soldier and a nurse, history had a dialogue with art across the time. The magnificent and eye-dazzling 850-year-old Notre Dame cathedral was granted a full-bodied sense of technology. The frontal lines, the sculptures on the exterior wall and projections were fused with each other. Classic paintings joint performance of firework were all exhibited in 3D perspective.



Fig.2 light show, Notre-Dame De Paris,



Fig.3 Artwork, Guggenheim Museum Bilbao
picture taken from:
<https://www.theguardian.com>

Artwork of Guggenheim Museum Bilbao On October 2017, Guggenheim Museum Bilbao created a 20-minute public artwork for the 20th anniversary of Frank Gehry's architectural masterpiece in Spain. This artwork combining light, music and projection were played on a loop across four evenings. 59 Productions, the world leader in projection-mapping, was commissioned to produce a 20-minute public artwork called Reflections. This special anniversary program celebrated the role this museum has been playing in making Bilbao and the Basque region a thriving artistic centre.

1.2 Famous light festivals around the world

Lyon Festival of Lights The Lyon Festival of Lights, held on December and usually lasts for four days, is a centuries-old religious tradition where people use candlelight to express gratitude toward gods.

Today, the festival does still retain the art form of candlelight: every house still places candles along the outsides of all the windows to produce the spectacular ambience throughout the streets; a romantic candle show is held in Odeon of Lyon every year. On the other hand, it also integrates modern lightscape that sparkles in this old city: there are contemporary lighting artworks in the center and dozens of other places on the periphery, where sound, light, electricity, lasers and 3D special effects are widely used. The whole city is checkered with light and shades, attracting artists from France and all over the globe to show their talent here. Among pieces of



Fig.4 Lyon Festival of Lights
picture taken from:
<http://www.sohu.com>

art equipment, we can find some amazing works of traditional culture, such as the elegant colored drawing LUMIÈRE DE VERRE, Homer's epic Odysseus, were expressed using modern techniques. A astonishing and modern light and sound show is staged annually in the front of the gothic cathedral Saint-Jean Baptistete.

In Lyon, traditional and modern lightscape coexist ideally in harmony.

Vivid Sydney Light Festival Vivid Sydney light festival, started in 2009 as the smart light festival which promoted energy conservation , has become a famous stage for universal creativity competition. During the 3 weeks from May to mid-June every year, there are tens to hundreds of exhibitions and events, including lighting sculpture, multimedia interactive works, as well as the show of water, fog, light and shadow. Most astonishing among those are the projections of landmark, including the eye-catching super light show of Sydney Opera. In Vivid Sydney, the public are guided to communicate and have a discussion on art, where they have sufficient chances to interact with unique lighting technology.



Fig.5 light show, Sydney opera,
Vivid Sydney
picture taken from:
<http://www.poco.cn>

So much unprecedented lightscape has been created thanks to technology development; in correspondence, unique lightscape also shortens the distance between those technologies and human.

2. NEW LIGHTSCAPES IN CHINA

As China grows in economy, science and technology, there have been many high-profile events held in China in recent years, including G20, Fortune Global Forum 2017 and other worldwide theme activities. Guangzhou International Light Festival has been held annually for 7 years, and in 2015 was selected to International Year of Light large-scale cultural event by UNESCO(United Nations Educational, Scientific and Cultural Organization), with a special recommendation on the website of International Year of Light.

2.1 Group of 20, 2016, Hangzhou, China.

On October 2016, Hangzhou city undertook the G20 conference. Hangzhou, located in East China, is the most beautiful landscape city of China with the world-renowned west lake scenic spot. Zhang Yimou, the chief director of the opening ceremony of 2008 Beijing Olympic Games, directed a overwater artistic performance "Enduring Memories of Hangzhou" for G20, in which the application and effect of high-tech light and shadow was unprecedented. With the stage set 3cm under water, the traditional atmosphere “ glistening wave and reflective water” of Chinese gardens was best portrayed. The show used the Pepper's ghost holographic projection technology to integrate images into the show harmoniously, where the performers were even able to interact with the lights. It was hard to tell the authenticity of bridges, lotus pond and pavilions in the view of natural lake, trees and mountain; the combination of light, music, scenery and performances brought audiences into the wonderland of Chinese classical landscape beauty.

Swan Lake ballet on water On the west lake, graceful dancers performed the classic ballet Swan Lake while shuttling through the milky way of an ancient bridge. This program uses holographic projection where real actors and virtual images interacted and completed the performance together. One of the most breath-taking scenes was: under the arched light bridge between landscape, a little swan appeared gracefully. After



Fig.6 Swan Lake ballet on water
picture taken from:
<http://www.wekeywu.com>

several challenging rotations, it split into 2 little swan, then 4, then 8... Suddenly, a group of swan girls magically appeared, and danced lightly, unanimously and gorgeously.

Piano playing “Clair de lune” Moonlight has always been an important part of the west lake scenery, evidenced by the natural lightscapes "Autumn Moon over the Calm Lake" and "Three Pools Mirroring the Moon". The performance combined the moonlight with the piano piece "Clair de lune", one of the most well-known works by French composer Debussy. When the smooth and stretched music was played craftily by the pianist, LED lights shaped the poetic hazy background atmosphere. The holographic projection of the moon entwined with the reflection of the moon in the water, coupled with the distant picturesque nightscape, composed a modern view of the west lake lunar landscape.

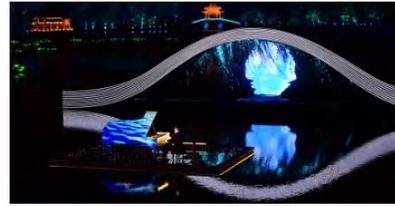


Fig.7 Piano playing "Clair de lune"
picture taken from:
<http://www.xinhuanet.com>

Play "A Beautiful Love Story" "The Butterfly Lovers" is one of the four folk love stories in ancient China, which tells the tragedy of a pair of young lovers who fell in love with each other but could not stay together, and reputedly they turned into two concomitant butterflies in their deaths. The play "A Beautiful Love Story" is based on this myth. On the performance, when two dancers danced to the waves like two chromatic butterflies flying to the center of the stage, a huge fan was slowly unfolded from the surface of water. Then, patterns on the fan transform continually between various elements of traditional Chinese realistic painting including peony, orchid, peacock, blue and white porcelain, landscape and human characters. As the story continues, the fan rotates tridimensionally following the rhythm of music until the last note gradually fades away. Finally, the giant fan submerged into the water and the lake returned to calmness.

The fan is a traditional Chinese handicraft as well as a special local product in Hangzhou. This special mechanical folding fan, believed to govern a representative temperament of Hangzhou, measures up to 20m in diameter with a total weight of 20 tons. When spread out, the fan becomes an upright screen for well-designed 3D video to project on using 3D mapping. When it is furled, it is hidden underwater. The opening and closing of the fan have achieved precise synchronization with the live music, the video projection and dance tempo of the dancers in the performance.



Fig.8 play, "A Beautiful Love Story"
picture taken from:
<http://www.wekeywu.com>

2.2. Guangzhou International Lighting Festival

Guangzhou is a diversified southern metropolis. Over 2200 years of history blesses it with a deep traditional culture as well as opening, innovative and inclusive temper.

Beginning in 2011, at the end of every year, the Guangzhou International Lighting Festival is held at Flower City Square on the "new city axis of Guangzhou". The festival revolves around different themes each year and each has its own merits; for example, in 2015, representatives from Lyon, Sydney and Singapore were invited to communicate in present, and the 3D projection work "Illusion", which had shined on Vivid Sydney, was on display, while "People Screen" connected Perth in Australia with Guangzhou via internet.

The lighting festival has now become a tourist interest in Guangzhou. The 2017 Guangzhou Lighting Festival lasted for 24 days, had served more than 8 million people; moreover, the original artwork "Rain Beating Plantain" will visit Guangzhou's sister city Lyon for its lighting festival.

3D Print Work: Butterfly-changing Canton, 2016

The annotation of metamorphosis in Chinese represents a striking change towards perfection, similar to the rapid transformation of a pupa into an butterfly. At the main venue of 2016 Guangzhou International Light Festival, two gaudily-dressed "butterflies" perched on the side pool of Guangzhou Grand Theatre, contrasting with the streamlined main building of the very



Fig.9 The Butterfly-changing Canton, picture taken from: <http://itbbs.pconline.com.cn>

dynamic Theatre. To demonstrate the connotation of another butterfly-changing of Guangzhou city as the capital of commerce for thousands years. This work is actually an experiment in the field of architecture, as a bold attempt combining 3D printing technology and architectural digital design. The big "butterfly" span up to 6.6m and is 12 meters long, with only two supporting points, but the body part is only 3.8 cm thick. Its irregular hyperbolic form and texture are like the microscopic veins of the leaves. The entire set of the thin shell weighs 500 kg and was assembled from nearly a thousand units printed by 50 3D printers.

"Rain Beating Plantain", 2017 Canton music is one of the traditional Chinese local musics, and "Rain Beating Plantain" is the most representative and well known. Plantain, also known as Chinese banana, is a common native plant in Guangdong. 《The artistic lightscape installation "Rain Beating Plantain" involves environmental elements that frequently appear in Canton music such as plantain, moonlight, mini bridges, lotus leaves and colorful cloud, with the virtual rain scene to strengthen austral atmosphere, all created with light. The main artwork is formed with LED light source; the light outlines shape of plantain leaves and their venation. The moon in the background is made up of LED light pixels, which projects changeable clouds, and the luminance changes following the rhythm of the background music. As a gesture of friendly communication, this lightscape artwork is going to attend the festival of Lyon. There will be interactive factors added at the time, making the production more interesting.



Fig.10 "Rain Beating Plantain" picture taken from: <https://mp.weixin.qq.com>

2.3 Fortune Global Forum 2017, Guangzhou, China.

Fortune Global Forum is one of the most influential financial forums in the world, and the vibrant city Guangzhou was chosen to host it in 2017. More than 1000 business leaders, politician and economists attended.

Drone Formation Performance In the evening of December 7th, a welcome cocktail party was held in Canton Tower, while 1180 unmanned aerial vehicles flew over the Pearl River, performing a 8 minute technological dance. First, the drones formed the Chinese character "财富", which means "Fortune", and then changed to "FGF". Then, the formation transformed into different patterns, in the order of ship(Since Guangzhou is an old port city), the Chinese character "开放", "创新" which means correspondingly "open" and "innovation", English letters "I LOVE GZ", and last but not least the map of China, which marked the end of the show. Only 1 computer was needed to control the total of 1180 flying drones, and the error tolerance of precise positioning was 2cm. The lighting sets carried on the drones can create 60 thousand kinds of color, and change intensity as freely as



Fig.11 the drones formed the Chinese character "财富" picture taken from: <http://gd.people.com.cn>

breathing lights, which means designers can construct almost any pattern as they wish.

River Bank Animation Show Guangzhou is close to the South China Sea. It has been the departure port of Ancient Maritime Silk Road, and was the only port open to the oversea merchants in Qing dynasty. As the Pearl River flows from west to east across the urban area of the city, the beautiful scenery on both sides is an important tourist resource of this city with intriguing history and culture.

During the 2017 Fortune Global Forum, guests took a cruise along the "Pearl River Night Tour" route to enjoy the lightscape animation that was shown on continuous facades of the 24 buildings on the north shore. The animation called "Stories of Guangzhou" is ten minutes long, divided into two parts. The first part, called "Southland Pearl, Thousand Years", depicts the prosperity of the ancient "Maritime Silk Road"; the second part, called "Amorous City of Lingnan", shows the traditional culture of porcelain, jade, tea culture, spices, embroidery, food culture, as well as characteristic Lingnan elements such as gardens, fruits, kapok, carp and lotus pond. This work utilized 210 thousand efficient LED lamps, which were coordinately controlled on the big data platform. The installation lasted for four months, involved the cooperation of as many as 1500 construction workers, including 500 steeplejacks.



Fig.12 the map of China picture taken from: <http://news.sina.com.cn>



Fig.13 cars play in the water picture taken from: <http://s.dianping.com>

EPILOGUE

This paper shows some light-works closely related to our life. Modern scientific and technological means can both create unprecedented lightscape and give traditional lightscape vitality, enabling its survival and further development. We wish, with the support of modern technology, designers would use more lightscape, soundscape, smellscape, and allow their combination with other forms of art, and more brilliant buildings, gardens and cities would turn up.

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