Abstract

Using an ongoing design project—China's Meishan Culture Park in Hunan Province—as a case study, this paper examines a four-dimensional design approach that incorporates time features into conventional three-dimensional space design. Time features are incorporated through the use of various design elements that constantly change through time. Thus, both the first and final images of the landscape are unpredictable, and the landscape is part of a dynamic process. The key feature of such a design is the transformation of a static landscape into a dynamic one that is authentic, historic and diachronic.

Keywords: Meishan Cultural Park; four-dimensional; diachrony; design practice

1. Introduction

Diachrony normally refers to the appearance of a feature or phenomenon in different geological periods or to a change in the meanings of words over time (as the Swiss linguist Saussure noted). Both of these definitions emphasize variation over time.

However, such time features can also be found in other fields. Japanese architect Kisho Kurokawa introduced into architectural design the theory of "Metabolism", which states that a city behaves similarly to a continuously evolving organism. Urban design should be able to accommodate these unpredictable changes while retaining a city's unique and lasting characteristics. Kurokawa's design theory explains the importance of embracing changes over time, even if the changes are partial and microscopic rather than functional. Consequently, a landscape design, especially one with historic features, should not be static and mechanical; rather, it should create a four-dimensional space that includes time—a diachronic landscape.

This paper examines a design project, the Meishan Cultural Park in Hunan Province, in which local traditional structures and culture form the dominant themes. The study discusses feasible ways in which the landscape can be made diachronic through design expression.

The paper is organized as follows: Section 3 explains how the diachrony of materials can contribute time features to a landscape. Section 4 discusses how the diachrony of forms can enhance the timeline to a landscape from using an actual old structure to creating an imagination of old structure. Section 5 explains how the landscape design of Meishan Cultural Park utilizes different phases of the ecological life span of a plant, ranging from its flowering cycle to its dormant period, to depict transformation through the four seasons and to provide an experience of shifting scenery through time.

2. Overview of Meishan Cultural Park

Meishan Cultural Park is located in one of the birthplaces of Meishan Culture - Anhua County, Hunan Province, China. The park is devoted to preserving the heritage of the Meishan culture, one of three ancestral Chinese cultures (the other two are the Zhongyuan and Jingchu cultures) and an important part of Huxiang history in central south China.

Over thousands of years of evolution, the Meishan culture has developed its unique characteristics, forming local regions with distinctive religious and humanist features, customs and art symbols. Meishan Cultural Park (Fig.1.) is not a conventional historic district. All the designs exhibited in the park are based on several surveys of local traditional and historic structures and the habits and culture of residents in the Meishan area. The park has been constructed as a multi-functional cultural base for academic research into the Meishan culture, for art and design teaching, and as a tourist destination.

The park's landscape designers made an all-out effort to thoroughly examine and utilize any available resources to produce a refreshing four-dimensional landscape with spatiality and a sense of time.
How is it possible to design and clearly reflect the diachronic characteristics of a landscape? Time features can be realized by changes that can be observed. There are two aspects to consider when merging a timeline into a design expression. Changes that have already occurred relative to the original condition should be acknowledged and presented appropriately. Possible future changes, which can be roughly predicted by certain patterns based on common sense, should be considered in the first step of the design process. In this way, changes are either incorporated into the design or expected to have a minimal impact on the design expression.

3. The Diachrony of Materials in a Landscape

The physical appearance of the materials used greatly contributes to the "first impression" of a landscape. Similarly, different textures of materials induce different feelings. Representative traditional historic structures in nearby villages are used as physical prototypes (Table 1.) in the design expression of the park. People always tend to fixate on the features of preexisting structures (Purcell, A. T., & Gero, J. S., 1996; Youmans, J. R., 2011), including time features. To maintain or restore a historic district, fidelity to the original appearance is always a priority, especially when old materials can be used (Zhu, Y.H. et al., 2010; Liu, H.T., 2012). Therefore, the park has implemented two approaches to the use of materials, approaches that are commonly employed in the preservation of historic sites and buildings: "borrowing" and "antiquating".

3.1 "Borrowing" Old Materials

To "borrow" old materials is to find new applications for old materials from old buildings. The term "old buildings" does not refer to museum pieces or buildings.

Table 1. Important Designed Structures in Meishan Culture Park and their Prototypes

| Traditional style       | Designed Structure | Prototype Example |
|-------------------------|--------------------|-------------------|
| Traditional Covered Bridge | ![Bridge](image1) | ![Prototype](image2) |
| Stone Beacon            | ![Stone Beacon](image3) | ![Prototype](image4) |
| Stilt-styled House      | ![Stilt House](image5) | ![Prototype](image6) |
| Traditional Gable       | ![Gable](image7) | ![Prototype](image8) |
that are in excellent repair but to plain, ordinary, low-value old buildings, especially rundown ones.

Husserl, in *On the Phenomenology of the Consciousness of Internal Time*, described time as parasitic, is describable only as it appears through actions and experiences. Thus, each property of old buildings is recognizable as a physical record of time.

Old materials have unique qualities due to aging caused by temperature, humidity, sun exposure and other natural forces. These time features are embodied in chromatism, grain patterns and textures that have undergone random minute changes. Murtagh (2005) referred to the irregularities of material surfaces caused by time and use as "patina", which he strongly recommended be retained during preservation.

The Meishan area enjoys a subtropical continental monsoon climate with abundant light, heat and rain. Annual precipitation is between 1,200 to 1,700 mm. The "patina" is clearly observed in the old buildings. These marks of time are appreciated and used in suitable places inside the park. One example is the cultural museum entrance. The walls on both sides of the entrance are covered by brick materials taken from nearby ancient buildings that can no longer be restored (Fig.2.). The mottled mosses sprawling wildly on the bricks display a natural decorative beauty in their random multi-colored patterns.

3.2 "Antiquating" New Materials

"Antiquating" is the process of artificially aging a surface through physical distress or chemical treatment to produce a timeworn appearance, creating the illusion of having naturally evolved over time.

Wood and stone are the materials most commonly used in the Meishan area in traditional structures. Generally, the color and texture of the surfaces of wood objects are prone to visual alteration due to external factors such as nature or human intervention (Hwang K., Park B.S., Park J.H., Chong S.H., 2009). Thus, the distinct changes that wood undergoes over long periods are more severe than those characteristic of other local materials used in the Meishan area. The use of "antiquating" methods to intensify and accelerate aging is therefore more effective on wooden structures than on other types of materials.

All buildings in the park that are constructed of lumber have undergone smoking, staining and other chemical processes to emulate a weather-beaten exterior. Examples include the replicas of traditional wooden houses on stilts over water (Fig.3.) and a covered bridge (Fig.4.).

4. The Diachrony of Forms in a Landscape

4.1 "Borrowing" Old Structures

In addition to borrowing old materials, sections or entire parts of dismantled ancient buildings can be salvaged and incorporated as independent elements into the landscape design.

Several minority communities, such as the Miao and Yao, are present in the Meishan area. The buildings, known as vernacular buildings, are constructed by the communities themselves, using traditional and natural methods (Ju, S. R., Omar, S., Ko, Y. E., 2012). These
constructions exhibit the slow processes of growth, maturity and decline along with the esthetic sense of minority. According to the Charter on the Built Vernacular Heritage by ICOMOS, "Changes over time should be appreciated and understood as important aspects of vernacular architecture. Conformity of all parts of a building to a single period will not normally be the goal of work on vernacular structures." Changes capable of absorbing the passage of time without losing the architectural original intention have made the buildings' forms intelligible and their language accessible to everyone.

Due to the "spontaneity" of folk constructions and autonomous minority communities, local structures inherit distinctive characteristics from the original builders' diverse personalities and lifestyles. Building components, such as doors, intricately carved windows and column bases, serve similar functions but exhibit different styles of presentation. The collection of these memoirs from different eras and owners illustrates the uniqueness of local traditions and the evolution of indigenous culture over time.

The sections of column bases taken from ruined buildings of nearby villages exemplify the use of recycled antique structures in the park. These bases were gathered and reused as unique adornments along the park roads (Fig.5.). Carved windows and doors were also collected and used as representations of art and symbols of time in addition to their physical functions (Fig.6.). These features display the primeval architectural art of the Meishan Era and provide eye-catching decor for the road and for building designs.

4.2 The Representation of Traditional Lifestyle

A lifestyle is not a contingency but a set of behaviors that characterize everyday life. The sequence or rhythm of life over time is significant. Traditional lifestyles, through association with objects and places, represent a sense of collective memory of communities, telling stories of people, events and places through time. It provides a sense of continuity and of the flow of time.

With rapid industrialization, some ancient lifestyles in the Meishan area have disappeared. Many ancient inventions—such as the traditional rainwater harvesting system, in which rainwater is collected from rock surfaces (Fig.7.), and an archaic watermill, which is driven by hydraulic power (Fig.8.)—have been replicated in the park to reproduce scenes of primeval lifestyles. Although these replicas are newly manufactured, they illustrate ancient ways of life and the "Genius Loci" of the Meishan region and thus exhibit diachrony.

Fig.5. Column Bases as Road Decoration

Fig.6. Carved Windows and Doors as Building Decoration

Fig.7. Rainwater Harvesting System

a) A picture of the Watermill

b) A sketch of the Stone mill
c) A sketch of the Water locks

Fig.8. The Watermill
4.3 An Analogy of Architectural Structure Imperfection

It can be inferred from archeological discoveries that historic structures and objects deteriorate due to geological change, erosion, other natural factors and human influences. Because this gradual deterioration is random, unpredictable and uncontrollable, conventional opinion views it as a defect and insists that structures be maintained with the utmost care and that damaged sections be repaired and restored to their original conditions. However, structural imperfections can evoke endless inspiration, representing longitudinal historical development. When safety requirements are met, incomplete structures or objects deliver a special type of fragmentary beauty, a collaboration with nature. The American designer Koren (1994) observed, in his book on Japanese Sabi-Wabi, that "all things, including the universe itself, are in a constant, never-ending state of becoming or dissolving". Koren advocates an appreciation of an "impermanent, imperfect and incomplete" type of beauty.

The design process is the mental manipulation of conceptual representations to explore complex relationships among design features (Simon, H. A. 1986; Youmans, J. R., 2011), and design expression can in turn also be a source of mental incitation. From the very beginning, the designers of the park chose to embrace the aesthetic style of "incompleteness" and "impermanence" by displaying the remaining abstract forms of ruined structures created by nature. According to Gestalt psychology, when an incomplete image is presented, people fill in the missing parts, using their own analyses and inductive reasoning based on personal imagination, experiences and the information withheld.

For instance, the main gate of the entranceway (Fig.9.), the theatric stage and the Wusheng gate on the dam (Fig.10.) all provide visual stimulation, induced by their imperfect appearance, to create an illusion of the past and to enhance and boost the interpretation of the park's diachronic landscape. In addition, changes over time are unlikely to defeat the original purpose of the design expression.

5. The Diachrony of Plants

The diachronic characteristics of a plant are reflected in its natural ecological cycle, from species selection to evolution, growth, competition, death, decay and regeneration. Only when the expectation of a constant result from one period of cultivation or the "final" image of the plant is broken can the natural visual exhibition of assorted vegetation produced by nature best represent the diachronic characteristics.

5.1 Randomness from Moderately Unrestrictive Growth

In typical garden design, the state of vegetation is fully controlled through maintenance, for example, by periodic pruning or trimming, to retain an originally intended arrangement. The landscape architect Ian L. McHarg (2006) explained the geometrization process of plants as a metaphysical symbol of a benign and orderly world.

However, plant growth is random and irregular in the natural world. The design slogan of William Kent, one of the originators of the English landscape garden, was "nature abhors a straight line", a take on the cliché that "nature abhors a vacuum". Ancient philosophers believed that no space in nature is unoccupied because every available niche of bare ground will immediately be covered by some plant.

There is no need to deliberately restrain the growth of vegetation within boundaries. Instead, appropriate natural landscape design should not only allow for the spreading of plants but also accommodate any unexpected plant development with only moderate maintenance, as nature will provide diverse experiences of time passing, through the life cycles of the assortment of plants offered.

The soil surfaces of the park are covered with natural materials such as loose pebbles, crushed stone, gravel, sand, stone ripraps, tree bark, clay and wood chips rather than hard pavement to avoid restraints on spontaneous plant growth, especially in areas where plant breeding and growth are desired. Because the climate is suitable, herbaceous plants, especially the indigenous plant species Imperata cylindrica and Hemerocallis fulva, thrive. As shown below, with the help of nature, the tops of the theatric stage's stone pillars and the bridge's plinth are covered with an uncultivated thicket of vegetation (Figs.11. and 12.) that will continue to change and replenish over time.

5.2 Visualizing the Biological Cycle

According to the aesthetic philosophy of Oudolf, the famous Dutch landscape architect, the beauty of plants at all stages of their lifecycles should
be celebrated. Setting himself firmly against the conventional horticultural practice of cutting back herbaceous vegetation in autumn, Oudolf allows it to stand until spring. He once said, "a plant is only worth growing if it looks good when it is dead" (Dunnett, N. & Hitchmough, J. (Ed.), 2008). Robert Thayer, a landscape professor at the University of California, proposed an aesthetic visual ecology that also stresses the importance of displaying the aesthetic visual effects of a plant's entire natural life cycle (Yu K.J. et al., 2001).

The park has carefully selected plants that best represent seasonal change: plants with dazzling blossoms in spring, vibrant greens in summer, beautiful foliage in autumn and withered and bare branches in winter. The park's landscape design utilizes the different phases of the ecological life span of a plant from its flowering cycle to the dormant period to exhibit the transformation of the four seasons and to provide an experience of shifting scenery over time (Figs.13. and 14.).

6. Conclusion

As an integrated system of nature and society, the environment is influenced by both natural and human factors. The complexity of environmental structures reflects the characteristics of affiliation and continuous change expressed in spatial forms of organization. Contemporary landscape design should cater to such characteristics by bringing time-related features into conventional three-dimensional space design.

This paper has discussed design strategies for expressing the diachrony of landscape, using a case study of the Meishan Culture Park design project.

Awareness of time is experienced through the diachronic characteristics of landscape elements, to which special attention should be devoted during the design stage. Time-related features are enhanced through a combination of natural and artificial items, ranging from materials and structures to vegetation. The diachrony of materials expressed through the reuse of old materials and the antiquation of new materials creates an external physical record of time and affects people's visceral judgments. The diachrony of forms is expressed through the reuse of old structures, the reproduction of old scenes and the design of structural imperfections that represent the internal psychological record of time carried by collective memory and associations. The diachrony of plants, expressed through the ecological cycle, implies an ongoing temporal process rather than a single moment in time. Thus, using all these design methods, a four-dimensional approach is deployed in the landscape design of Meishan Culture Park, producing a unique landscape that is interesting, inspiring and unpredictable.

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