

# Meanings and Construction: Evolution of Inheriting the Traditions in Chinese Modern Architecture in the 1980s

Wei Wang

**Abstract**—Queli Hotel, Xixi Scenery Spot Reception and Square Pagoda Garden are three important landmarks of localized Chinese modern architecture (LCMA) in the architectural design context of "Inheriting the Traditions in Modern Architecture" in the 1980s. As the most representative cases of LCMA in the 1980s, they interpret the traditions of Chinese garden and imperial roof from different perspectives. Based on the research text, conceptual drawings, construction drawings and site investigation, this paper extracts two groups of prominent contradictions in practice ("Pattern-Material-Structure" and "Type-Topography-Body") for keyword-based analysis to compare and examine different choices and balances by architects. Based on this, this paper attempts to indicate that the ideographic form derived from macro-narrative and the innovative investigation in construction is a pair of inevitable contradictions that must be handled and coordinated in these practices. The collision of the contradictions under specific conditions results in three cognitive attitudes and practical strategies towards traditions: Formal symbolism, spatial abstraction and construction-based narrative. These differentiated thoughts about Localization and Chineseness reflect various professional ideologies and value standpoints in the transition of Chinese Architecture discipline in the 1980s. The great variety in this particular circumstance suggests tremendous potential and possibilities of the future LCMA.

**Keywords**—Construction, Meaning, Queli Hotel, Square Pagoda Garden, Tradition, Xixi Scenery Spot Reception.

## I. INTRODUCTION

FROM the "Inherent Form" in China in the 1920s to the "National Form" in the 1950s, inheriting the tradition has become an unchangeable theme in the history of modern Chinese architecture. However, exploring "Inheriting the Traditions in Modern Chinese Architecture" in the 1980s is the return of this traditional context. It presents weariness to some extent, under the intervention of market, the retreat of political pressure and the western culture shock. On the one hand, the ideological discourse had been continually reflected on and reconstructed. Market-oriented development led to liberty and criticism, whereas post-modernism led to pluralism, thus gradually dispelling the single political discourse. Architects who have been freed from pressure are dissatisfied with the constraints of specific forms and ideologies and are eager to break through the dualistic value measure system of "tradition/modernity" to establish independent, critical and constructive architectural discourse. On the other hand, in practice,

architects were excavating the localism and regionalism of traditional dwellings and gardens in China instead of developing the national form of the palace and the imperial roof. Based on the discussion on structural rationality, material authenticity and other physical issues, researchers have further shifted their focus to such prepositions as the relationship between space and context, body and terrain, and region and climate, related to man and architecture. During this period, the practice of "Inheriting the Traditions in Modern Chinese Architecture" (hereinafter referred to as tradition inheritance) is accompanied by exploration into the creations of tourist hotels and scenic spot architecture. Xixi Scenery Spot Reception designed by Ge Ruliang, Queli Hotel by Dai Nianci and Square Pagoda Garden by Feng Jizhong are three important landmarks during this period. Xixi Scenery Spot Reception (1981), a representative work of LCMA, integrates the architectural form and the natural landscape by absorbing from the dwellings. By exploring the integration of the modern and the tradition of Chinese architecture, Queli Hotel (1985) was designed as a quadrangle courtyard with the imperial roofs in the extremely special venue, only one wall from the Confucius Family Mansion and the Temple of Confucius, so that it can be environmentally coordinated with the cultural relics. Based on the fundamental problems in ordinary architecture, Square Pagoda Garden (1986) was built as a modern garden based on the principle of joining the past and becoming the new and extracting the Song Dynasty's spirit on the original site of the Square Pagoda in the Song Dynasty [1].

Based on traditional patterns or types, these explorations present different creative tendencies and design strategies in the reciprocal causation and interaction between the form, construction, site, and body elements. They express three different attitudes towards tradition and reflect the different choices and trade-offs of the architects between the interpretation of meaning representation and the expression of independent construction. These differentiated thoughts reflect various professional ideologies and value standpoints in the transition period of Chinese architecture sciences in the 1980s. They are of great practical significance to understand the modern Chinese architectural history more profoundly and reflect on the Localization and Chineseness proposed presently. Unfortunately, the discussions on such practices in the 1980s were confined to the criticism of specific forms and ideologies whereas seldom touching on the architecture's ontological value and specific practices. This paper intends to make up for the deficiency, focus on the contradictions and differences

Wei Wang is with the Southeast University, China (e-mail: 18362927007@163.com).

between the three representative cases, and resort to the concerns about Conventionality and Localization for further understanding and cognition.

## II. PATTERN-MATERIAL-STRUCTURE

In the consensus system of the “National Form” built by Liang Sicheng in the 1950s, based on the principle of “composition” [2] which is the essential technique and method of knowledge structure of the Beaux-Arts architecture, traditional components such as doors, windows, columns, beams and brackets are added into the modern and universal architectural types and construction techniques as elements or terms, under the guidance of grammar, such as symmetry, balance and proportion. It is eclectic to acquire such traditional forms. In the 1980s, architects made various ground-breaking attempts to present the tradition of imperial roof based on this.

The cross-ridge gable and hip roof with multiple eaves above the foyer of Queli Hotel is a cautious attempt (Fig. 1). Externally, the grey-tiled roof is nothing more than the traditional stereotyped image of the cross-ridge gable and hip roof with multiple eaves. Internally, it is actually a 12m-long square concrete folded-shell structure with supporting point distributed in four corners of the foyer, replacing the structure organically combining the beam frame bucket and the roof in ancient architecture (Figs. 2, 3). The structure is faithfully displayed indoors. The unique force-bearing characteristics and light and shadow expressions of concrete fit the function of the interior ceiling whereas suitable to interpret the structural form of the folded shell. The multiple eaves are slightly elevated, and glass windows are installed. A circle of thick hollow overhanging eaves is cantilevered along the edge at the bottom of the folded shell to facilitate window cleaning, and on the triangular gables around the folded shell, the traditional bargeboards are replaced by lattice windows. The natural light in different seasons and at different times enters indoors through the lattice windows and stays in different positions of the overhanging eaves, turning into spots or patches of light and recording the time with the migration of positions. From the perspective of construction, the tectonics order of the roof ceiling follows the construction order endowed by the nature of materials. Compared with the archaized way of using reinforced concrete to imitate the structural scale (span and component proportion) of the timber structure, it is undoubtedly a fundamental breakthrough. The breakthrough, however, is subtle and restrained. The concrete folded-shell structure is still wrapped in the formal “coat” of dark tiles and grey tiles, whereas the external formal characteristics of the cross-ridge gable and hip roof with multiple eaves are still intact. The cornice is made of purlins with dense concrete, cement concave-convex surfaces replace rafters and bucket arches, and the beams under eaves are also treated with simulated caisson. The traditional components are simplified and deformed and become the decoration language of the new structure system. Such concrete, accurate and pictorial formal elements are solidified into traditional styles. As a symbol of tradition in values, they are divorced from the characteristics of materials and construction logic.



Fig. 1 The cross-ridge gable and hip roof with multiple eaves above the foyer of Queli Hotel **Hata! Başvuru kaynağı bulunamadı.**



Fig. 2 Concrete folded-shell structure of Queli Hotel  
(Figure source: Author photography)

The interpretation of meaning representation in form is more thoroughly reflected in the Xidan Market building in Beijing. The traditional roof (including the pillars) is abstracted, simplified and deformed, and reassembled as a form fragment or symbol placed in the middle of the facade to express the symbolism and metaphor of the “tradition”. This approach avoids the premise constraint of structural rationality, separates the structural and spatial foundation of the traditional roof, and obtains support under postmodernism context. In fact, in such a strong and metaphysical posture and narrative method, the roof breaks away from the artisan tradition and the spatial foundation of the traditional quadrangle courtyard. It is reduced to a pattern or form fragment abandoning the practical operation and social attributes, a puzzle that satisfies the vision and association.

Xixi Scenery Spot Reception by Ge Ruliang abandons the symmetrical and complete roofs like those in traditional palaces but makes the transformation of the roof follow the real topography and functions, which originated from Ge Ruliang's research on local dwellings and vernacular architecture [3]. He did not attempt to find a universal formal characteristic but adopted an unconventional formal operation based on conforming to the topography and function. In the Xixi Scenery Spot Reception, step platforms with different elevations are placed under a complete pitch roof, replacing the traditional practice of raising small roofs layer by layer, and making the slope of the roof comply with the slope of the terrain (5.5:1). In addition, it also tries to reproduce the performance of the traditional wood structure. The construction logic of the Xixi Scenery Spot Reception is expressed directly and distinctively (Fig. 4). The concrete roof's multi-ribbed beams overlap directly onto the horizontal main beams as prefabricated linear

elements. The column-beam system of the roof and the multi-ribbed roof are poured separately, intentionally mimicking the construction of the traditional wooden frame system. The horizontal beam connection between the two different trusses of columns seems to imply the operation of “penetration” in timber structural system. However, the large horizontal beams seem to have undermined the space's integrity and fluidity under the roof whereas also resulting in the odd way in which

the beams meet the independent rubble wall. Horizontal beams are not necessarily structural except to maintain stability between the two columns considering the column foundation is strong enough, the beams appear to be possibly omitted. To some extent, this kind of deliberate imitation and reproduction of the wooden structure system seems to be affected by Liang Sicheng's structural rational thought, instead of rationalizing the construction mechanism.

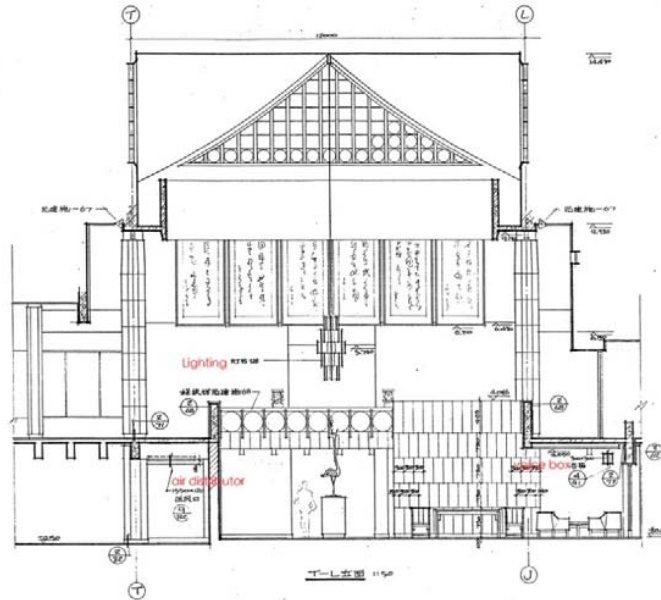


Fig. 3 Section of the foyer of Queli Hotel [11]



Fig. 4 The column-beam system of the roof and the multi-ribbed roof of the Xixi Scenery Spot Reception [3]



Fig. 5 The staggered roof at the entrance of the Xixi Scenery Spot Reception [3]



Fig. 6 The hip roof on the Square Pagoda Garden's north gate [10]



Fig. 7 The bamboo roofs of the Helou Pavilion [10]

Feng Jizhong's Square Pagoda Garden rejected the symbolism in form and the reproduction of the wooden structure, interpreting the tradition as an autonomous type of

construction. The hip roof on the Square Pagoda Garden's north gate is broken down into two separate single-pitch roofs. One is high, and the other low (Fig. 6); one is horizontal and the other vertical. Such ingenious decomposition and composition give the north gate the illusion of a gable and hip roof. The gestalt of the traditional pitched roof is deconstructed and separated from the value. It no longer reproduces a pattern or carries a meaning but serves as a pure architectural component or abstract space interface. Second, the structure of the north gate roof uses the common light steel truss structure of the industrial workshop, which is composed of small-section steel members. It refuses to imitate the high-level grand beams of traditional wooden structures, in stark contrast to the remains of the Ming and Qing dynasties in the Square Pagoda Garden. The bamboo roof of the Helou Pavilion is similar. (Fig. 7) Although it implies the gable and hip roof in terms of form, it comes from the prototype of bamboo huts [4]. The roof takes advantage of lightweight materials that are easily processed, transported and assembled, as well as the steeply pitched roof to drain rainwater quickly. Divorced from images, symbols and metaphors, materials and structures can express the unique characteristics of the materials and the structure, thus presenting the cause and effect of processing and masonry. Feng Jizhong opposes the eclecticism and style worship of the Beaux-Arts architecture, emphasizes the functionality and purpose of the building, and focuses on the essential issues of why, how and for whom the architect constructed [5]. In these practical explorations around the interpretation of traditions of imperial roofs, the Queli Hotel emphasizes the symbolic meaning of the form, and the Xixi Scenery Spot Reception seeks the representation of wooden structure or component form. Moreover, the Square Pagoda Garden carries out material characteristics and construction cause and effect based on the specific sites. Three different creative tendencies show the reality and performance of the material and structure, the aesthetics and symbol of historical patterns, and the tension caused by the opposition and uncertainty between them.

### III. TYPE-TOPOGRAPHY-BODY

The "courtyard" of the 1980s provided a core characteristic that avoided the formalistic label and covered nearly all Chinese traditional spaces [6]. Both Queli Hotel and Square Pagoda Garden have interpreted the traditional spatial type of "courtyard" in practice but revealed two distinct creative orientations.

Since Queli Hotel is only one wall from the Confucius Mansion and Confucius Temple, Dai Nianci regarded the quadrangle courtyard as the planar form of the guest room area of the Queli Hotel to prove that this traditional space can still exert its functions well [7]. The guest room area is arranged along the central axis with three courtyards connected by cloisters. Such a large building is endowed with a small scale, similar to the layout and scale of Confucius Mansion and absorbs the axes from Confucius Temple and Confucius Mansion (Fig. 8). There is a geometrically controlled precision in the classification and combination of the different units in the guest rooms, the corresponding corridors and the public spaces.

Even the positions of the plants in the courtyard have been carefully designed as part of the plane symmetry design. Although the Hotel takes the quadrangle courtyard as the prototype, it tends to adopt its shape in the passive response to its site and use, emphasizing the volume change of the building itself rather than the courtyard itself. There is a square green space surrounded by a circle of corridors in the courtyard, making it impossible to prepare for the narrative of time and events. In the self-sufficient and closed form, the sentiment and character of the traditional quadrangle courtyard have not been explored.



Fig. 8 The main courtyard in Guest room area of Queli Hotel (Figure source: Author photography)



Fig. 9 The view to the east of the entrance of Queli Hotel (Figure source: Author photography)

The layout of the public area of the Queli Hotel borrows the form of Chinese traditional garden, which reveals the resistance to symmetry and order. In the three core spaces of the foyer, dining room and meeting room, the four central columns at the ceiling level and the walls on the four sides constitute a centralized main space, divided into two groups which are connected on different axes with a transitional space in the middle, and they form into a cross-shaped plane centered on the foyer. Due to the complexity of the plane function, the functional volume that "overflow" outside the ideal space unit tends to present the form of "appendage" [8] in the formal composition (Fig. 10). The pool with gradient changes at the entrance, the winding path beside the pool, and the hall and dining hall across the water, are a group of spatial images from the Chinese traditional garden. They enlarged the "overflow" effect of the small space and transformed it into an elaborate arrangement, so that it could satisfy Dai Nianci's assumption of a fan-shaped viewing effect in the southeast corner of the Hotel from the perspective of the west exit of Wumaci Street. Simultaneously, it is also a way to break the homogeneity of



space and obtain the asymmetry and elegance (Fig. 9). However, due to these geometric considerations based on plane composition or fixed-point perspective, the architect pursues an immediate and direct perception, and lacks the management of designing the locations differently near and far and the plot ideas of changing the scene step by step, which makes the Hotel lack a flat, open and organic space like a Chinese traditional garden.

It can be seen that the Queli Hotel constructed the architectural form based on the geometric language of western architecture to "reproduce" and "translate" the spatial prototype and formal elements of the Chinese traditional courtyard. However, the assumption of traditional space types constructed geometrically cannot be fully presented since space is limited to functional rationality and moderation through the variation in accordance with the site or the utilitarian combination in agreement with the plane composition and visual effect. By contrast, Feng Jizhong pursues the traditional Chinese way of life embedded in the garden, rather than any specific style of a physical object or spatial form [9]. "The perception of the artistic conception and the generation of imagery come from the level of cognition, life experience and traditional edification." [5] He considered the Chinese garden as a space that projects the cultural life and meaning of traditional Chinese literati, and to explore this tradition means to understand and comprehend it in an empathetic way, and then reproduce the artistic conception or image, rather than just clinging to the garden itself.

When designing Square Pagoda Garden, Feng Jizhong took classic gardens as the prototype, started from the topography, and introduced the narrative of the time and the body, eliminating the specific self-sufficient and secluded form. On the original site of the Square Pagoda in the Song Dynasty, Feng Jizhong proposed to build a garden in the style of the Song Dynasty and give up the technique of stacking stones into rockery like those in the Ming and Qing Dynasties. In such a large site, Feng Jizhong used far fewer words those in the gardens of the Ming and Qing dynasties. The gate, path, square, white wall, cutting road and Helou Pavilion were all there. Unlike Queli Hotel's approach, which lays perfect aesthetic proportions on the plan, elevation, and section of the building, Square Pagoda Garden incorporates special geometric control lines closely related to the history of the site in the building's plane location and vertical elevation. The diversified and complicated texture of the site leaves another exquisite architectural interpretation oriented towards history. The walls surrounding the pagoda courtyard are broken (Fig. 11), the pavements are broken in corners (Fig. 12), and the river channel is enlarged, and the roof is slightly and precisely varied. On the basis of the traditional methods of white walls, grey tiles and bluestone paving, it only takes such a tear to break and reconstruct the construction by cutting, fragmenting or dicing. The large white wall facing the water at the foot of the square tower remained unchanged with such a long stroke (Fig. 13). Through such a moderately controlled brushwork that dares to leave blank and exaggerates, two dimensions are created, whereas one is vast and deep and the other is small but deep,

making the building jump out of the traditional formula and produce unknown and flexible uncertainty.

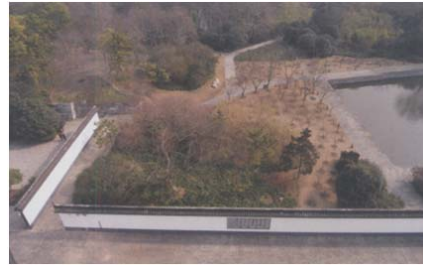


Fig. 11 The broken walls surrounding the pagoda courtyard [10]



Fig. 12 The broken pavements in corners [10]



Fig. 13 The large white wall facing the water at the foot of the square tower [10]



Fig. 14 The stone bench in the Bamboo Pavilion [10]

Square Pagoda Garden writes the "meaning" of the time with the spirit of nature, which guides the flow and transformation of space and provides an opportunity for the progression of the incident [1]. Nine arc walls of different heights, diameters, and

orientations are inserted between the building and the slope, which serve as a retaining wall and is used to project the natural light together with the ground. Natural light in different seasons and at different times is retained at the ground or the wall in different ways, and then turn into spots or pieces of light. Time is recorded based on the change of its position and then transformed into a visual dimensional space, revealing its existence to the guests there. The eaves of the roof of Helou Pavilion on the side facing the pond are set low and far out to the water to control people's sight down at the pond under the eaves for quite a while. The changes of light and shadow outside come with the carefree and ancient artistic conception. At the Bamboo Pavilion, the stone bench, which is half inside the eaves and half outside the eaves, can be regarded as a spatial component that strengthens the path, defines the spatial interface, and divides the left and right sides of the site. At the same time, it is also a prop that can invite events to be staged. Visitors can choose to sit in different positions on this bench, whether on sunny days or rainy days, in cold winter or hot summer, or many or few visitors. Above the spatial elements, it seems that the architect gives the stone stool the role to be used and further decomposed the formula of the usage behavior on it and endowed it with new value and identity. With a flexible brushwork that responds to the real existence of human beings, he returns architecture to the mediocrity of life (Fig. 14). In this way, he interprets the traditions of Chinese garden as a long process of dialogue with ancestors and integration with the lives of ordinary people, full of practical problems and cultural imagination.

Queli Hotel and Square Pagoda Garden display the two main creative orientations separately when interpreting the courtyard tradition—morphological extraction and narrative reappearance. The priority in design is dealing with the contradictions between the topography, the type and the body. For Queli Hotel, the narrative of the body is limited to the differentiated needs for the use, which seems to be the direct cause of the collocation of different plane patterns, but the choice of type is the key framework that dominates the preconception of space generation. For Square Pagoda Garden, the narrative of the body lies in the presentation of traditional life and culture, whereas the interpretation of the type is a passive response to the use of space and site conditions. The narrative of site and body constitutes a more critical trigger in design, shaping the generation of "event" and "behavior" space in architecture.

#### IV. CONCLUSION: MEANING AND CONSTRUCTION

On the surface, the design strategies reflected in the practice and exploration of tradition inheritance can be divided into three categories according to their attitude towards tradition: symbolism and quotation of form, abstraction and extraction of space, and representation and narrative of the construction.

Queli Hotel's geometrical presentation of the traditional quadrangle courtyard and garden space, its reference and transformation of traditional roof forms, and the symbol extraction and fragmented combination of the traditional roof forms by the Xidan Market Building are essentially to

reproduce and translate the prototypes of Chinese traditional space and formal elements with the architectural language of the West, based on the ideological shackles of linking tradition with form and to add the historical patterns and styles to the structure and function of modern architecture. In this way, the absorption and metaphor of the tradition were confined to the formal symbols and metaphors. Moreover, it did not touch on the deep mechanism, rules, even the realm and mood of traditional Chinese architecture. However, Xixi Scenery Reception adopts an unconventional formal operation in accordance with the terrain and imitates the construction logic of the traditional timberwork. Beyond the external representation of traditional forms, architects extract the design ideas and general treatment techniques behind traditional spatial forms for analysis, abstraction, extraction and generalization, and then make serialized variations according to the actual situation. Moreover, it is an abstraction and extraction of the traditional space and formal order [9]. The Square Pagoda Garden deconstructs the complete form of the imperial roof, restores the autonomy of construction, and presents the narrative of the site and body. It does not stay at the level of concrete imitation or abstract refinement but reaches a higher level of artistic conception creation, which expresses the deep interpretation of the life and culture behind Chinese traditional architecture. Furthermore, these practices reflect the consideration of multiple complex factors: the trigger and interaction between topography, type and body, the coexistence or opposition between the reality of construction, the symbolism of patterns and the aesthetics of composition, as well as the imprecise and unclosed implicit overlapping between concept, image and physical property. Based on these considerations, architects make concessions and trade-offs in multi-level considerations caused by the essential complexity and contradiction of the architecture. In fact, it also reflects the choice and balance between the interpretation of meaning representation and the expression of construction autonomy.

Among various interpretations towards tradition, the material of concepts and images makes architecture a symbol and carrier of meaning, whereas the emphasis of artisans' work and physical property pulls architecture back to the "here and now" from the projection of the past. On the Queli Hotel and Xixi Scenery Spot Reception, the meaning is separate from the construction—Meaning is assumed by form, and construction, subservient to form, is the means to implement the form, although construction must modify form partially or to a certain extent. At that particular era with specific discourse and specific circumstances, this separation is decorum, but involves limitations, which are the inevitable leap and translation difficulties in the linear development of architecture from generalization to concreteness and from concept to operation. In this process, the diversity and complexity of traditional architecture are lost. However, a cognitive attitude and practice strategy, in which the construction generate and create the meaning, rather than express the meaning [5], can better interpret the essence of tradition and is reflected in Square Pagoda Garden. In Square Pagoda Garden, the site conditions, space requirements, materials methods are the key elements to

promote morphological relations, whereas the construction itself constitutes the meaning of architecture. Square Pagoda Garden is designed based on the rules of construction, where there is nothing abundant. The less affectation on the material there is, the closer it is to the primitive basic skills and the ordinary everyday things, the more spiritual and transcendent it is. Square Pagoda Garden is the first prototyped experiment of the architecture of Chinese character typologically. These explorations around "Inheriting the Traditions in Modern Architecture" are impossible to be measured by the rule of "tradition/modernity" because the practice itself has broken this dualistic value measure system. From the ideographical expression of the form and abstraction of space, to reproduction of artistic conception, and from the meaning representation from the macro and ideological angles to the emphasis of the ontological value and concrete practices of architecture, the different choices and trade-offs in contradictions reflected in these practices are the most typical slices of the times. These are the epitome of the struggle and quest under the macro-topic of "Tradition and Modernity" in Chinese architecture in the 1980s, waiting for those who look back nowadays to re-watch, re-understand and retell it in another way.

#### ACKNOWLEDGMENT

First of all, sincere appreciation should be acknowledged to Professor Shi Shuigao. Moreover, appreciation should be given to Mr. Cao Xiaoxin for providing the first-hand materials, which is a key material for this thesis.

#### REFERENCES

- [1] Feng Jizhong. Join the Past, Become the New: Discuss on the Planning of the Square Pagoda Garden and the Design of Helou Shelter (J) *Huazhong Architecture*, 2010, 28.
- [2] Zhu Jianfei. *Sixty Years of Chinese Architecture (1949-2009): History, Theory and Criticism* (M) Beijing: China Architecture & Building Press, 2009.
- [3] Peng Nu, Wang Yiyi, Yao Yanbin. A Case Study on Ge Ruliang's Xixi Scenery Spot Reception (J) *Time+Architecture* (5):50-59.
- [4] Xu Wenli. Back to the Primitive Hut: A Brief Historical Survey of the Prototype of Helou Pavilion (J) *Architectural Journal*, 2018(5).
- [5] Wang Bowei. *Architectural String Columns: Feng Jizhong's Draft* [M]. Shanghai Science and Technology Press, 2003.
- [6] Zhuge Jing. Discontinuation or Continuation: History, Design, Theory and the Debates of "National Form" in *Architecture Journal* in the 1980s (J) *Architectural Journal*, 2014(Z1):53-57.
- [7] Dai Nianci. On the Design for Queli Hotel, Qufu (J) *Architectural Journal*, 1986(01):2-7+82.
- [8] Tang Fenglong. *The Construction of Geometry—The Architectural Principles of Frank Lloyd Wright, Ludwig Mies van der Rohe and Louis Isadore Kahn* (D) Tongji University; College of Architecture and Urban Planning, Tongji University, 2009. DOI:10.7666/d.y1603557.p26
- [9] Zhou Minghao. Intermediary for Creation and Aesthetic Experience: Searching for a Modern Architecture Inheriting the Tradition of Chinese Garden in 1980 (J) *The Architect*, 2014(5):79-87.
- [10] Zhang Yonghe. *For a Basic Architecture* (M) Beijing: China Building Industry Press, 2002.
- [11] Digital File System. China Architecture Design Research Group