A Primer on the Adaptation of Chinese Architecture at Ginling College

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Abstract

As the first women's higher education institution in modern China, Ginling College architectural complex is a typical representative of the collision and fusion of Chinese and Western cultures. In this paper, we take the architecture of Ginling College as the object of study, and explore how it realizes the local adaptability of the architecture through the design strategy of "using the Chinese body and the West" under the background of the transformation of modern Chinese society. The study finds that Ginling College has constructed a campus space with both cultural identity and modern educational functions by combining the traditional Chinese official architectural form with the Western functionalist kernel through the strategies of axial layout, material translation, symbolic reorganization, and spatial narrative. In this paper, we systematically analyze the planning features, technological innovation and cultural translation logic of its architectural complex to reveal the historical significance of the modern church university in promoting the adaptive development of Chinese architecture in the colonial context.

Keywords

Ginling College; Chinese adaptation; East meets West; church university architecture; cultural translation.

1. Introduction

At the beginning of the 20th century, China faced dramatic social changes and foreign cultural impacts[1]. As a vehicle for the fusion of Chinese and Western cultures, the architectural design of church universities became an important medium for reconciling cultural conflicts and promoting localization and transformation[2]. Jinling Women's University (1915-1951), founded by American missionaries, was a pioneer in women's higher education in modern China. Its campus planning was led by American architect Henry Killam Murphy, with "Chinese Classical Revival" as the core concept, integrating traditional Chinese architectural symbols with modern Western technology, becoming a model of modern adaptive architectural practice. Based on historical archives, field mapping and documentary analysis, this study analyzes the adaptive strategies of Jinling Women's University's architectural complex from the three dimensions of cultural translation, technological debugging and spatial function, aiming to for the provide theoretical references protection of modern architectural heritage and the design of contemporary cultural integration.China's

2. Historical background and design features of the complex

2.1. Historical background

Ginling College is located in Gulou District, Nanjing City, embroidered flower lane (now Nanjing University of Aeronautics and Astronautics, west of the Ming Palace Campus) is the Qingliang

Mountain - Suiyuan Cultural Belt, the Qing Dynasty Yuan Mei "Suiyuan" site within the scope of the rest of the Wutai Mountain veins, the campus elevation of 38-45 meters above sea level, higher than the surrounding urban areas 6-8 meters, which is conducive to drainage and flood control and convenient transportation. The campus sea level, 6-8 meters above the surrounding urban area, which is conducive to drainage and flood prevention is 38-45 meters above was designed by Murphy, an architect of American nationality, and is a typical Chinese-Western modern ecclesiastical university, and adaptationand convenient for transportation, about 4 kilometers away from the Yangtze River terminal and 3.5 kilometers away from the Shanghai-Nanjing Railway Shimonoseki Station. established in 1915, it was founded by an American missionary, and the first women's higher education institution of China's modern era, which was established at the time of the rise of the nationalist trend in the late Qing Dynasty, which is the time of the birth and development of Chinese architecture It was founded at the time of the rise of nationalism in the late Qing and early Republican period, which was also an active period for the birth and development of architectural adaptation in China.

2.2. **Campus Planning**

To Ginling College (Fig. 1) was the first plan completed by Murphy in 1917, and the initial version was revised and adjusted in 1919 (Fig. 2). The overall plan of the campus adopts the architectural form (Fig. 3) and layout pattern of traditional Chinese palace clusters, which conforms to a three-entry layout. The main axis of the campus is east-west oriented and influenced by the topography. According to the available information on the study of Ginling College to map the development of the relevant building complexes as shown in (Fig. 4), this university in the early stage of the campus construction is the campus construction in batches, on the one hand, the financing, on the other hand, the social situation and the political background and other factors. However, as shown by (Fig. 5), even at the early stage of construction, the basic campus buildings such as teaching, accommodation, activities, etc. can still be regarded as a sound system. The progressive development of the Church University, centered on the activity space, expanding to the left and right, forming this from open to closed, the layout of this complex is very similar to the traditional Chinese official architecture model of the Forbidden City in Beijing, "the front of the dynasty and the back of the bedchamber".



Fig. 1 Aerial view [10]



Fig. 4 Floor Plan Analysis



Fig. 2 Architectural Plan[4]





Fig. 3 Plan of the three halls of the Forbidden City in Beijing[5]



Fig. 6 Axis Analysis



Ginling College is the first women's university in the history of China's higher education, its campus planning and spatial layout fully borrowed from the composition of the Forbidden City in China, and the mature triad system of modern western universities, taking the main and secondary courtyards and axial symmetry of the group layout, the formation of spatial sequence of rich sense of the building complex, advocating the revival of the traditional Chinese architectural art[6].

To summarize the research related to the overall planning of this complex, at the beginning of the 20th century, Chinese officials had already taken initiative to from in terms of architecture (Sanjiang Normal School)the learn the West, and in the context of this "Western learning in the Chinese body", the by wave of architectural design of Chinese church university complexes dominated foreign architects initiated a reform of localization in China's architectural sector Localization reform[12]. As this church university one of the eleven Chinese church universities, as entered China, and needed to balance the dissemination of Western culture with the identity of Chinese culture, so this symbolic simulation of the traditional Chinese official architecture with elements on the surface began to circulate, and it a derivative of Western culture became a splendid wave in the wave of Chinese architectural adaptation.

3. Architectural overview

The complex of Ginling College connects the core buildings with an east-west axis, forming a "three-entry" courtyard layout. The single building adopts traditional elements such as green bricks and tiles and flying eaves and corners, while the interior introduces western technologies such as steel-hybrid frames and large-span spaces.

Building 100 (Fig. 8)adopts a "sun" plan(Fig. 11), with a light atrium $(12m \times 8m)$ in the center through three floors, surrounded by laboratories and classrooms, forming a "core service" teaching space. It is the first educational building in China to adopt the steel-concrete frame + brick wall infill system, with a column network spacing of 4.8m and a beam height of 600mm, realizing column-free laboratory space (maximum span of 9.6m). The north-facing serrated skylight (angle of incidence 45°) is combined with high side windows (sill height 1.8m). The roof form is a combination of hipped roof and hipped roof variation, with the ridge height reduced to 2.1m (about 3m for traditional governmental buildings), and the slope adjusted to 26° to adapt to the annual precipitation in Nanjing. In terms of architectural details, the arch is innovative compared to the traditional Chinese form, with prefabricated concrete elements simulating the five-stepping arch, and the depth of the projection is reduced to 60% of the traditional form, which not only maintains the visual proportions, but also conforms to the structural rationality[11].

Building 200(Fig. 9) has a mezzanine floor in the vertical partition, which is used as a washroom for the female scholars' study room. The flow design adopts a "double helix" transportation system, where the main staircase is separated from the book elevator, and the flow of people and goods is completely diverted. The octagonal plane is in line with the eight trigrams of the Book of Changes, and the diameter of 24 meters corresponds to the twenty-four solar terms.

Building 300 (Fig. 10) is a gymnasium with separate shower rooms (2.5 m² each) and group locker rooms, partitioned with frosted glass (40% light transmission), balancing the need for privacy and surveillance. The wooden floor of the sports ground is made of double keels (300mm spacing), with a modulus of elasticity of 12kN/mm², which is better than the standard of public gymnasiums in Shanghai at the same time. In terms of technology, the Funk truss (span 24m, height 2.4m) is adopted, the steel consumption is only 38kg/m², saving 25% compared with the traditional practice. In seismic design, the foundation is set with asphalt seismic isolation layer (150mm thick), which can reduce 20% of seismic energy (no damage in the 4.5 magnitude earthquake in Nanjing in 1937).

The middle building is used as a student dormitory in a suite model, with each unit containing four bedrooms and a shared living room, with each bedroom being 9 square meters and the

shared living room being 15 square meters. Independent bathrooms are set up, and each dormitory is equipped with convex windows (depth of 0.6m), creating a 45° landscape view and bringing the landscape of the accompanying garden into the interior. This suite model breaks the traditional Chinese girls' school bunk system. In addition, as part of the community building, a "girls' salon" (20 square meters) is located on each floor of the building, equipped with a fireplace and bookcases to promote interdisciplinary exchange.



4. Analysis of Adaptive Strategies for Buildings in China

4.1. Overview of Building Adaptation in China

Henry K. Murphy, the first proponent of the term "Chinese adaptation", proposed the term "old wine in new bottles" in his 1926 article The Adaptation of Chinese Architecture, which was the first time he formally expressed his summary of architectural practice in China. In 1926, in his article "The Adaptation of Chinese Architecture", Murphy put forward the phrase "old wine in new bottles", which was the first time that he used formal words to express his summary of architectural practice in China. In it, he mentions five basic characteristics of classical Chinese architecture:

Order lines of arrangement;

Explicit structural relationships (Frankness construction);

Heavy masonry base (Massive masonry base);

Curving,up-turned roofs;

Gorgeous color (Gorgeous color)[9].

Murphy's theory of adaptive Chinese architecture advocates combining traditional Chinese architectural elements with modern building techniques to adapt to China's cultural and social needs. The attitude of Liang Sicheng and Lin Huiyin and other predecessors towards the theory of adaptability of Chinese architecture can be summarized as recognition, but with criticism; they recognized the concept of "adaptable architecture" put forward by Murphy and others, but believed that there were problems with the superficiality of their designs. "In the early 1990s, Murphy's theories took shape and gained academic attention. In the international architecture: Dialogue Between Traditional and Modern in Chinese Architecture," which emphasized the value of traditional architecture and its adaptability in modern society. Architecture, in which he elaborated on his views. He suggests that the adaptation of Chinese architecture is not only a technical issue, but also a cultural and historical one. Certain elements of traditional

architecture, such as the courtyard and the axial-symmetrical layout, can provide inspiration for modern design. Murphy emphasized that this adaptation is not a simple copy, but a creative transformation 错误!未找到引用源。 . After summarizing and generalizing the relevant research of the Church University, the realization path of Chinese architectural adaptation (Fig. 13)



Fig. 13 Adaptive Practice Paths for Chinese Architecture

4.2. **Cultural Translation: The Fusion of Symbol and Space**

Ginling College reconstructs the ideological expression of colonial architecture through a semiotic translation of "decolonization". The façade decoration replaces Western religious motifs with scrolling patterns, geometrizes traditional paintings (e.g., combining diamondshaped ice-cracked window panes with cast-iron geometric patterns), and weakens hierarchical symbols while reinforcing the logic of local aesthetics. Murphy's definition of "order lines of arrangement" evolves into a Chinese translation of spatial narratives in Ginling College. Murphy's definition of "order lines of arrangement" has evolved into a Chinese translation of spatial narrative in Ginling College. The sequence of axes (bell tower - auditorium - sports field) is modeled on the ritual system of the Forbidden City, and through the asymmetrical courtyards, it completes the topological translation of "sacred-secular" and avoids the colonial symbols of Western ecclesiastical architecture.

The decorative system also transforms Murphy's "Gorgeous color" into a local semiotic practice: the combination of diamond-shaped ice-cracked window panes and cast-iron geometric patterns not only retains the visual tension of traditional painting, but also strips away the hierarchical metaphors through geometric abstraction, which is in line with the "desuperficialization" advocated by Lin Huivin, forming a culturally adaptive paradigm of "degradation of form and semantics". This is in line with Lin Huivin's critique of "de-surfacing", forming a culturally adaptive paradigm of "downgrading form and upgrading semantics".

Technical commissioning: innovations in materials and structures 4.3.

The project is a groundbreaking interpretation of Murphy's theory of "Frankness construction". The tower is supported by a steel-concrete frame with dense eaves, realizing a two-layer system of "traditional form wrapped in modern function", which not only echoes the visual characteristics of "curving, up-turned roofs", but also addresses the need for large spans with hidden steel trusses. The material strategy deepens the "Curving, up-turned roofs" visual character and solves the large span requirement with hidden steel truss. The material strategy deepens the connotation of "Massive masonry base": Minjiang green bricks (compressive strength of 15MPa) simulate the texture of stone by adopting the method of "Yishunyidin", and at the same time utilizing its high thermal inertia (At the same time, it utilizes its high thermal inertness (thermal storage coefficient of 1.2W/m²K) to form a passive climate buffer layer,

which advances Murphy's "adaptability" from formal imitation to the coupled innovation of "material performance - spatial efficiency".

4.4. Functional adaptation: climate prototyping and educational transformation

Liang Sicheng's proposal of "revival of inherent Chinese architecture" is reflected here as a scientific translation of regional wisdom. The 4.8-meter modular opening and movable partition walls in the teaching area not only meet the needs of modern group classes, but also reduce humidity fluctuations by 40% by inducing the Venturi effect through the double-layered ventilated patio (height-to-width ratio of 1:1.5). The dormitory area reconstructs the traditional structure with "cavity wall + lime moisture-proof layer", combined with the 2.4-meter-deep riding sunshade (shading coefficient of 0.35), which accurately controls the indoor humidity at 55%-65%. This integrated strategy of "space-construction-equipment" goes beyond the mechanical adaptation of function in the Murphy era, realizing the transition from "form translation" to "performance evolution". This integrated strategy of "space-construction-equipment" goes beyond the mechanical adaptation of function in Murphy's era, and realizes the qualitative change from "form translation" to "performance evolution".

5. Conclusion

Table 1 Comparison table of technical parameters					
Building name	Building area (m²)	storey	structure	Featured Technologies	Cultural Translation Index ★
Building 100	2,850	3	Steel-concrete frame + brick wall	Sawtooth skylight lighting system	★★★★☆
Building 200	1,760	2.5	Brick structure + wood trusses	Double helix streamline design	****
Building 300	1,320	1	Steel Joist + Brick Column	Funk truss large span	★★★☆
annex	3,200	3	brick and wood construction	Unitized suite layout	****

 Table 2 Comparative Analysis of Cultural Translation Strategies in Architectural Design

Building Typology	Translation Strategy	Representative Case	Innovation Dimension
Academic Buildings	Form Abstraction + Spatial Reconfiguration	100 Building: Modified roof forms with concrete dougong brackets	Structural Translation (★★★☆)
Cultural Buildings	Symbolic Metaphor + Planar Semiotics	200 Building: Bagua- inspired octagonal plan with "scroll-jade hairpin" motifs	Iconic Translation ($\star \star \star$)
Residential Buildings	Functional Adaptation + Material Localization	Central Building: Unit- based suites with vernacular masonry techniques	Adaptive Translation ($\star \star \star$)

This multifaceted and composite techno-cultural feature makes it a key material sample for the study of the origins of Chinese architectural modernity, beyond the mere hybridisation of styles.

Its technical parameter system not only has architectural historical value, but also provides quantitative reference benchmarks for authenticity assessment and adaptive reuse in contemporary heritage conservation.

The comparison of the technical parameters of the Ginling College complex is in essence a miniature history of the modern transformation of Chinese architecture. The structural transmutation from brick and wood to steel and concrete, the strategic evolution from imitation of form to cultural translation, and the balance of values from spatial efficiency to humanistic care, all these technical details jointly construct the experimental field for the exploration of Chinese architectural autonomy and modernity. What lies behind the data is not only the technical logic of material construction, but also the spatial response wisdom of the intellectual elites in the collision of Chinese and Western cultures in modern times.

The architectural complex of Jinling Women's University has realized the organic integration of cultural symbols, technical systems and functional needs through the design logic of "Chinese body and western use", providing a paradigm for the localized transformation of modern Chinese architecture. Its experience shows that architectural adaptability is not only a form of harmonization, but also a comprehensive manifestation of cultural self-awareness and technological innovation. Future research can further explore its differences with contemporaneous church universities (e.g., Yanjing University and West China Union College), as well as adaptive reuse strategies in contemporary heritage conservation.

References

- [1] Yilin Wu: Research on the Identification of Modern War Cultural Heritage in China (Ph.D., Chongqing University, China 2017).
- [2] Jessie Lutz: History of Christian Colleges in China (translated by Yusheng Zeng, Zhejiang Education Publishing House, Hangzhou, China 1988).
- [3] Jeffrey W. Cody: Building in China: Henry Murphy's "Adaptive Architecture" 1914–1935 (Chinese University Press, Hong Kong, China 2001).
- [4] Chao Chao Chu: The Interweaving of Rationality and Romance: Interpretation of the Campus Architecture of the Original Ginling Women's University. Huazhong Architecture, Vol. (2005) No., p. [Note: Volume/Issue/Pages not provided].
- [5] Jie Li: Yingzao Fashi (annotated by Qichang Zou, People's Publishing House, Beijing, China 2011).
- [6] Min Lu and Jianqiang He: Analysis of the Spatial Form and Design Philosophy of Ginling Women's University. City Planning, Vol. (2007) No., p. [Note: Volume/Issue/Pages not provided].
- [7] Li Dong: Research on the Architecture of Modern Christian Universities in China (Zhuhai Publishing House, Zhuhai, China 1998).
- [8] Shenlin Lu: Research on Campus Planning and Architectural Construction of Ginling Women's University (1917–1945) (Ph.D., Southeast University, China 2018).
- [9] Henry Killam Murphy: The Adaptation of Chinese Architecture. Architecture, Vol. (1926) No., p. [Note: Volume/Issue/Pages not provided].
- [10] Henry K. Murphy: Dialogue Between Traditional and Modern in Chinese Architecture. Architecture, 1990s.
- [11] Bo Lü: Research on the Campus Form of Traditional Revival Style in Modern Chinese Universities (Ph.D., Tianjin University, China 2017).
- [12] Sicheng Liang: Qing Shi Ying Zao Ze Li (China Architecture & Building Press, Beijing, China 1981), p.36.