

THE FAILURE OF “CHINESE INTRINSIC FORM”

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ABSTRACT: Architectural trends in modern China have evolved into four stages over the course of history : from the “Chinese Form” in the 1900s, to the “Chinese Intrinsic Form” in the 1930s, to the “Ethnic Form” in the 1950s, and to the “New Ethnic Form” in the 1980s..

“Chinese Intrinsic Form” can be defined as an assembly of interrelated structural components -- wood-like columns, beams and corbel brackets -- of traditional Chinese construction reforming with a more sophisticated western technology, but in a holistic and unified manner. It mainly employed for administrative buildings, exhibition halls, commemorative buildings, gymnasiums and commercial buildings. A distinctive attribute of “ Chinese Intrinsic Form ” is its general layout of spatial sequence, as determined by the axisymmetric plane composition, interior configuration, and form offaçade.

The new era in nationalism promoting began when “Chinese Intrinsic Form” came into being in 1927. The Chinese architects wanted national pride of expression for the semi-colonial society of the day 1 without considering how their thoughts and design might aid or hinder the modern evolution of architecture in China. Or the true aspiration may be obscured through neglect rather than intent. In either event, notable questions arise as to whether the representing implication about “Chinese Intrinsic Form” is more about political or academic.

This paper is indent to discuss the historical background of “Chinese intrinsic form” and its architectural cases in order to explore the reasons why it failed.

Keywords: Chinese Intrinsic Form, traditional architecture, semi-colonial, modern China, building structure

1. INTRODUCTION

1.1 Brief introduction to the origin

As early as the 1850s, the outbreak of the Arrow war brought the re-introduction of Christianity to China¹, thereafter the western church and architects have traveled thousands of miles and lived here. Rather than intensifying the contradiction between the Western church and Chinese people under a cultural revolution and plunder, they adopted a reconciled attitude towards traditional Chinese culture by the inspiration of missionary work. In implementing this thought, they put on traditional Chinese costumes (See figure 1-1), preached in Chinese, and more importantly, they sinicized churches and other church construction.

Thus, at the beginning of 20th century, “Chinese Form” architecture adopted with western formalism started dawning with the advent of European Art Nouveau under the context of semi-colonial and semi-feudal society in China. However the practice of using western specific structure design for inner spatial composition has been denounced by the first generation of Chinese architects².

“Chinese Intrinsic Form” can be categorized into 3 different styles on a formal basis:

- Palatial – Retrostyle
- Hybrid – Eclecticstyle
- Characterized by decoration –Modernstyle

2.1 Brief introduction to the origin

2.1.1 Definition of RetroStyle

Retro style refers to the maintaining of the spatial volume, roof profile and overall contour of Chinese classical architecture, in other words, this palace-look style is given a specific set of traditional styling components and decorative details that, whether changed or optimized, cannot transcend the basic shape of classical architecture.

2.1.2 Case study of RetroStyle

As an official architectural style⁵, retro style is mainly employed for important administrative and educational buildings, the most typical representative of which is the Shanghai Municipal Government Building (See figure 2-1) designed by Dong Dayou⁶ completed in 1933.



Fig. 1-1 Foreign missionaries in Qinghai

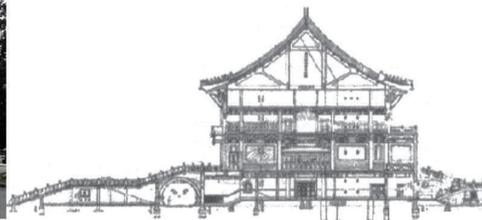


Fig. 2-1 Long section of Shanghai municipal building

It extends the architectural form of traditional palace, ranging from the proper sizing and proportion of structure components to the integrated volume. The façade adopts the traditional three-section composition. The horizontal section, consisting of the main body in the middle and two projecting eaves, provides a well-proportioned visual perception. The vertical section is divided into the elevated foundation, colonnade and soaring roof suggestive of classicism. The bulkier roofing consists of a Xieshan roof (See figure 2-2) in the middle and two lateral Wudian roof (See figure 2-2) on the side.

The traditional Chinese wooden form structure and Western modern structure share certain similarities in the sense since both of them consist of regular recurring trabeated frames. Thus, in foundation system and spatial composition design, Western structural technology can be used as a paradigm. However, their roof structures are quite different from each other.

Beam-lifting system (See figure 2-3) -- the upper part of chapters formed by overlapping purlins and molded beams -- has been employed for traditional Chinese roofing structure over thousand years. “Chinese Intrinsic Form” was no longer adopting this old way, but introducing a Western style truss support system.

Design this “palatial” roof structure therefore involves an infiltrating way of thinking. It is neither a simple imitation of western hanging trusses, nor the uplifting of the traditional overlapping joints. Rather, it requires a holistic manner in which the truss system based on the original structural members can enable the constructibility of the dramatic outward-flying eaves without having excessive deformation. The correspondingly increase of the ridge purlin (See figure 2-3) and eave purlin (See figure 2-3) led to a higher elevation and greater span, while the fixed intermediate purlins (See figure 2-3) on the roof truss chord enabled the invariance of the shaped joints. According to the horizontal spacing between purlins and those joints, the straight line of the upper chord on the triangular roof frame was changed into a concave fold line (See figure 2-1).

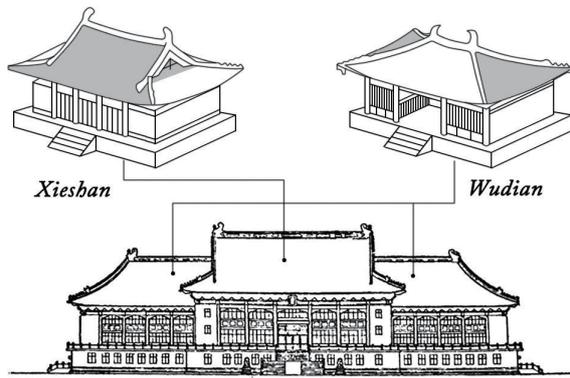


Fig. 2-2 Different traditional roofing

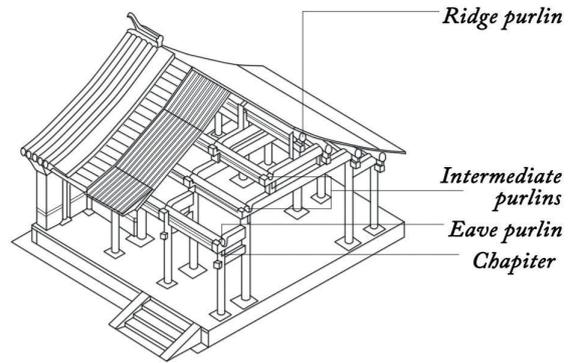


Fig. 2-3 Traditional beam-lifting system

2.1.3 Brief summary

Mandated by the division of general layout of Downtown Area Plan of Shanghai⁷ and the purpose of nationalism promoting, the municipal building needed to give others a visual clue to its sheer dominate role in the site by having the largest building volume. To enlarge the volume, therefore, auditorium, library, dining hall and any other irrelevant functions were integrated as a unified whole. However this is the destruction to the efficiency of land use and rationality of functional distribution.

The Shanghai Municipal Government Building was an outcome of official conservative cultural policies and nationalist ambitions that push the imitation of traditional architecture to an irrational extreme.

2.2 Hybrid – Eclectic Style

2.2.1 Definition of Eclectic Style

Different from retro style, this type of building breaks through the volumetric balance and overall outline of Chinese traditional architecture, and is not confined to the aforementioned three-section composition.

Its external appearance is subordinate to the functional requirements. Regardless of the form and scale of the buildings, the structural system of façade consisting of eaves, columns and architrave was further replaced by an assembly comprises windows, doors and load-bearing brick walls.

The roof still maintains the traditional form, oftentimes adopted a combination of one partial large roof and flat roofs, while the form of exterior walls responds to constraints of the Western volume, and the decorative components of façade respond to the Sinicism.

2.2.2 Case Study of Eclectic Style

The Zhongshan Memorial Hall designed by Lv Yanzhi⁸, a stellar case of eclectic style when completed, it is known for its innovative application of reinforced concrete and steel trusses.

A central octagonal roof hovers over a quadrilateral mass with front and rear side of double eaves Xieshan roof, two lateral sides of Xieshan roof. The floor plan (See figure 2-4) was drawn on the centralized composition of western classicism.

Changes in the application of building material illustrates the development of structural systems over time, from the early masonry-timber structure employed for the “Chinese Form” churches to the longer spans and higher durability of modern reinforced concrete framework. Steel trusses, as the main structure, are similar in roofing to Shanghai Municipal Government Building, supported the octagonal roof with a tapered profile (See figure 2-5).

Another attribute to the construction of this memorial hall is the extensive use of wood-clad precast reinforced concrete members, as determined by the requirement of structural components of traditional architecture. A multitude of enameled concrete corbel brackets serve as connections in between the enclosure walls and the roof, however compared with which were made of timber in Tang Dynasty⁹, they need to be differentiated structural using from expressive forms which are not, in effect, structural but only appear to be so.

It is worth mentioning that, the inconvenience caused by the free drainage of the large sloping roof had been frequently encountered in a storm-prone region, thus a

new drainage system was adopted for the memorial hall at that time. The specific way was to leave a piece of space as a rain ditch when laying the eaves tile at the bottom, then the drain pipe was embedded in the eaves wall or eaves column (See figure 2-3), in these configurations, an internal drainage system was formed. There is also a fatal drawback of this drainage system in which the falling leaves, dust or mortar left by construction could lead to a partial of drainage functions failing or even to its total collapse overtime.

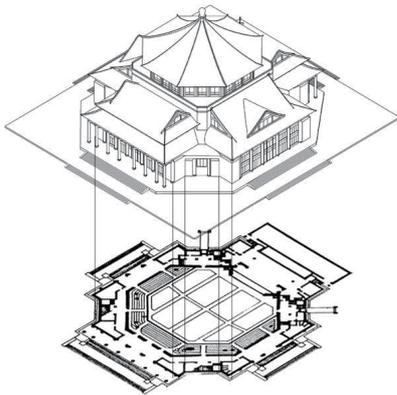


Fig. 2-4 Ground floor plan of memorial hall

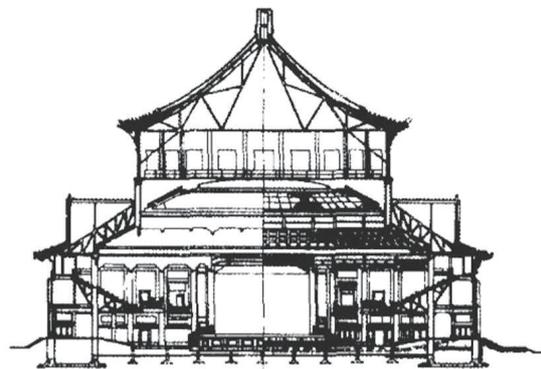


Fig. 2-5 Section of memorial hall

2.2.3 Brief summary

This is a bold attempt to explore “Chinese Intrinsic Form” for the auditorium buildings with new materials and new structures. The steel trusses and steel beams of this reinforced concrete system provide both greater span and larger volume throughout the building. The shape of this memorial hall is far beyond the conventional scale of Chinese classic pavilion construction, in addition to breaking through the volumetric balance compared to those in an early time, it maintains the image of an enlarged composite pavilion.

However, in organizing plane composition, the complex interior functions were confined to the shape of an octagonal spire, similar to the shortcomings in which the irrelevant functions got integrated inside of the Shanghai Municipal Government Building. A dilemma emerged as when the long-span engineering technology is at odds with desired traditional architectural form. Whatever the structural modifications were made were usually a result of shaping the building volume in such a way as to integrate irrelevant elements all together. Problems such as waste of space, complexity of structure and inconvenience of use need to be resolved.

2.3 Characterized by decoration – Modern Style

2.3.1 Definition of Modern Style

“Chinese Intrinsic Form” began to transition to an international way with the advent of “Art Deco”¹⁰. This western form, which is novel and economical, instantly drew the attention of Chinese architects and social interest at that time. Therefore, a new form based on “Chinese Intrinsic Form” – imitating the practice of “Art Deco” – was naturally set up for the revival of traditional architecture, that is, in place of striking structural components like the “big roof”, traditional ornamental details were appropriately decorated on the exterior walls. Thus when speaks of modern style, it refers to decorative details that unite with symbols of national characteristics in a concordant manner.

2.3.2 Case Study of Modern Style

Completed in 1935, the office building of ministry of foreign affairs of Nanjing National Government¹¹ was designed by Allied Architects¹². The building adopts a flat roof and a mix structure consists of reinforced concrete and bricks. This plane layout of Western modern composition is T-shaped, which breaks the sheer symmetry of functional

spatial arrangement of previous “Retro Style” and “Eclectic Style”(See figure 2-6). The exterior wall is covered with brown tiles and the entrance highlights the spacious white porch.

National symbolic decoration is mainly manifested on the simplified corbel brackets along the eaves, the ornamental patterns of the wall between the windows on the top floor and the carving ornament on the porch chapter (See figure 2-7).

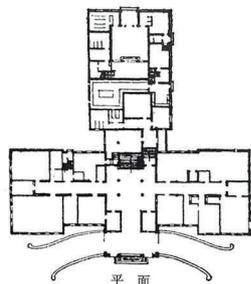


Fig. 2-6 Ground floor plan and outlook of the office building **Fig. 2-7 Symbolic decoration on the eave**

2.3.3 Brief summary

Throughout the long-time practice of Modern Style, what has remained constant is the enduring logicity of structural forms capable of withstanding the shackles of traditional

architectural form and boldly responding to the conditions and requirements of industrialized society that time.

Modern Style can be related to the distinct rationalism, another attribute of this style is that, where there is a correspondence between architectural form and internal functions, either may take precedence, they all need to be prescribed for the disposition of new materials and new structure within a building.

It emphasizes the logicity of architectural image, with concise processing techniques and pure building shape. Different from the two forms mentioned before, it started to focus on and solve practical functions and economic problems of architecture. But when it preceded blooming, the outbreak of war has brought “Chinese Intrinsic Form” into adownturn.

3. DISCUSSION

From the overthrow of absolute monarchy in the revolution of 1911 to the complete transformation into a colonial society, it was the accelerated transformation of the nature of society driven by foreign culture that enabled modern China to embark on the road of industrialization. New technologies emerged as a respond to the new demands of social activities and the increasing participation of citizens in social life has led to the rise of large-scale buildings.

Throughout the analyses and summaries of the aforementioned cases, in truth, with the increase of spatial scale and the span of roof structure, it was inevitable to introduce Western-style roof truss to traditional construction as when the Chinese architectural technology at that time had difficulty solving such problems. The adoption of reinforced concrete, steel and other emerging building materials alleviate the need for wood structure.

Certainly, the premise of the combination of new structural technology and traditional forms was self-contradictory, which consequentially led to contradictory results. The new structural technology was dictated to the architectural form, as its role of passive adaptation in this contradiction, which resulted in two defects about the “Chinese Intrinsic Form”:

- The irrationality of structure
- The irrationality of the cost

3.1 The Irrationality of Structure

The shear bracing employed for roof structure of “Chinese Intrinsic Form” strengthens the connection among roof trusses and helps to resist lateral force. Compared with the traditional wood structure, the new structure not only has

obvious advantages in materials, but also Strengthening the integrity of the entire roof structure, which has never been seen in ancient Chinese official construction.

However, due to the lifting and folding of the traditional roofing, the upper chord part of the roof truss is processed into internal concave fold line or curve, which is contrary to the mechanics of the truss structure, since it mainly adopts the external fold line or straight line to redirect external forces through the composition of tension and compression members. This reduces structural utilization (See figure 3-1).

At the same time, those archaic-look wood-clad beams, corbel brackets and other components that were supposed to be adopted for structural use in the past --whose formal significance exceeds the structural significance --have to be constructed in accordance with the original large-scale. This causes waste of materials. On the other hand, reduced structural efficiency has led to a reduction in building economics.

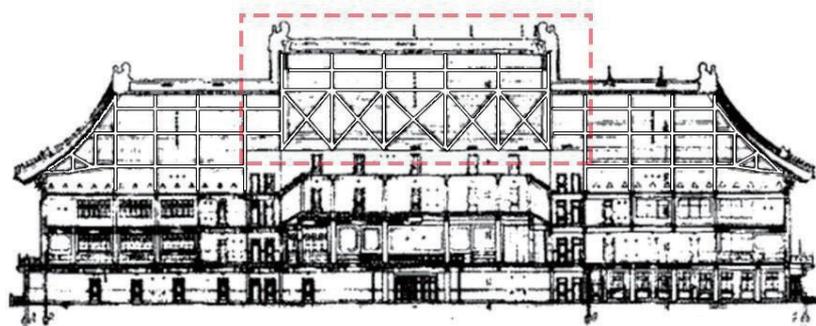


Fig. 3-1 Section of Shanghai Municipal Building

3.2 The irrationality of the cost

Where there is a correspondence between the structural efficiency and economics of building, either of them can prescribe the disposition of spaces within a building, and when they both decline, the space utilization will be greatly reduced. As mentioned in Shanghai Municipal Government Building and the Zhongshan Memorial Hall, the internal composing space of their “big roof” weren’t accommodated with the actual need and desire of their structure, which also triggered the result of low efficiency of functional spaces.

Especially in the Shanghai Municipal Government Building, the space that can be effectively used is only the first and second floor. Although the ground floor is 4 meters high, the room depth is 9 meters, however, considering the solid visual effect of the foundation within three- section composition, large windows are not allowed (See figure 3-2), only some pits were dug in the gaps of corbel brackets to provide additional lighting and ventilation (See figure 3-3).

Even though it promoted as a model as it was prescribed in “Capital Plan”¹⁴ and “Greater Shanghai Plan”¹⁵, within the chaos of the war, the huge construction costs have made it impossible for the “Chinese Intrinsic Form” to be implemented nationwide.



Fig. 3-2 Multiform small windows on the exterior wall

Fig. 3-3 Bad lighting in the municipal building

4.CONCLUSIONS

The failure of “ Chinese Intrinsic Form ” lies in the fact that the understanding of Chinese architectural tradition is only at the superficial formal level. When there is a conflict between the new construction technology and the traditional building form, the exterior expression invariably takes precedence, thus the technology is subordinate to the form. The original intention of the fusion of Western advanced technology and Chinese traditional architectural form was simplistic and idealized.

Technical factors are the one of the most basic driving forces to promote the development of architecture, rather than just a means to accomplish a certain form. “Chinese Intrinsic Form” is an exploration of the renaissance of traditional culture, however in the process of modernization of Chinese architecture, instead of a catalytic role, it played a blocking role, which is bound to be end with failure.

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1. Semi-colonial society: In June 1840, under the leadership of British Rear Admiral George Elliot and Charles Elliot, the First Anglo-Chinese war broke out. Ended with the failure of Qing dynasty, the Chinese and British signed the “ Treaty of Nanking”, China became a semi-colonial and semi-feudal society
 2. First generation of Chinese architects: See Bar Graph 1, The upsurge of studying in the USA, 1900
 3. Kuomintang: The Kuomintang of China (KMT; also translated as “Chinese Nationalist Party”) is a Chinese political party created by Sun Yat-sen and one of the oldest political parties in the Republic of China and Asia
 4. Second Sino-Japanese War: Refers to a national war in which China resisted Japanese aggression during the Second World War in the mid-20th century. It began from July 7, 1937, and ended in August 15, 1945
 5. Official architectural style: The Capital Plan of Nanjing formulated in 1929 and the Downtown Area Plan of Shanghai formulated in 1930 stipulated the Retro Style as the official architectural form, which was promoted nationwide.
 6. Dong Dayou: 1899 ~ 1973, was born in Hangzhou, Zhejiang. In the 11th year of the Republic of China (1922), he graduated from Tsinghua University and went to the university of Minnesota and Columbia University in USA
 7. Downtown Area Plan of Shanghai: Formulated in 1930, stipulated the roads in the design area are composed of the main road system and the secondary road system. The main road system is in the radial composition

8. Lv Yanzhi: 1894-1929, was born in Chuzhou county, Anhui province, was an outstanding architect in modern China
9. Tang Dynasty: 618-907, it was the unified central plains dynasty after the Sui dynasty, which lasted 21 emperors and 289 years
10. Art Deco: Art Deco evolved from Art Nouveau at the end of the nineteenth century, whose main characteristic was the sensuous elegance of nature
11. Nanjing National Government: April 18, 1927 to May 20, 1948, it was the highest administrative organ of the Republic of China National Government, managing the governments of all parts of the country
12. Allied Architects: Founded in January, 1933. It was one of the most important architectural firms established by Chinese architects in modern Chinese architecture history
13. The Revolution of 1911: A national revolution from 1911 to early 1912 aimed at overthrowing the Qing dynasty and establishing a republic
14. Capital Plan: See annotation 5
15. Downtown Area Plan: See annotation 7