

Research on the Interior Decoration Characteristics of Peking Union Medical College Phase I Project

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Abstract: Peking Union Medical College was founded in the late Qing Dynasty and the early Republic of China. Since then, society and politics have been rapidly changing, and its architectural aesthetics reflect the idea of advocating the West and inheriting tradition. Through research and actual investigation, this paper summarizes the current status of its building from two aspects, interior decoration art and interior decoration technology, analyzes the interior decoration characteristics of Peking Union Medical College Phase I Project, and records the archives of Peking Union Medical College's decoration technology.

Keywords: Peking Union Medical College; Healthcare architecture; Interior decoration features

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1. Introduction

At the end of Qing Dynasty and the beginning of the Republic of China, with the invasion of China by colonial forces, there are various stages in the development of Chinese architectural forms, including Western classicism, Chinese and Western eclecticism, as well as Chinese classicism. As one of the unique architectural types, medical buildings have unique expressions in terms of interior decoration. Peking Union Medical College is a typical representative of this period, and its interior decoration reflects people's pursuit of Western aesthetics, technology, and knowledge. Based on the background of the times and field survey, this paper analyzes the interior decoration, artistic thoughts, and culture of Peking Union Medical College Phase I Project.

Peking Union Medical College was formerly the Union Medical College under the Anglo-American Church. In 1915, The Rockefeller Foundation of the United States acquired the Union Medical College and the real estate of Prince Yu's Mansion in Santiao Hutong, Dongdan, where it was rebuilt as Peking Union Medical College ^[1]. The school-building project was completed in two phases: Phase I was designed by Shattuck and Hussey, while Phase II was designed by architect Anner. This article focuses on analyzing the interior decoration characteristics of Peking Union Medical College Phase I Project, involving buildings 2 (Anatomy Teaching Building), 3 (Chemistry Building), and 4 (Physiology and Pharmacology Teaching Building), as shown in **Figure 1**, the curved corridors and porters, *etc.* The total construction area of the cultural relic is 7,392 square meters.

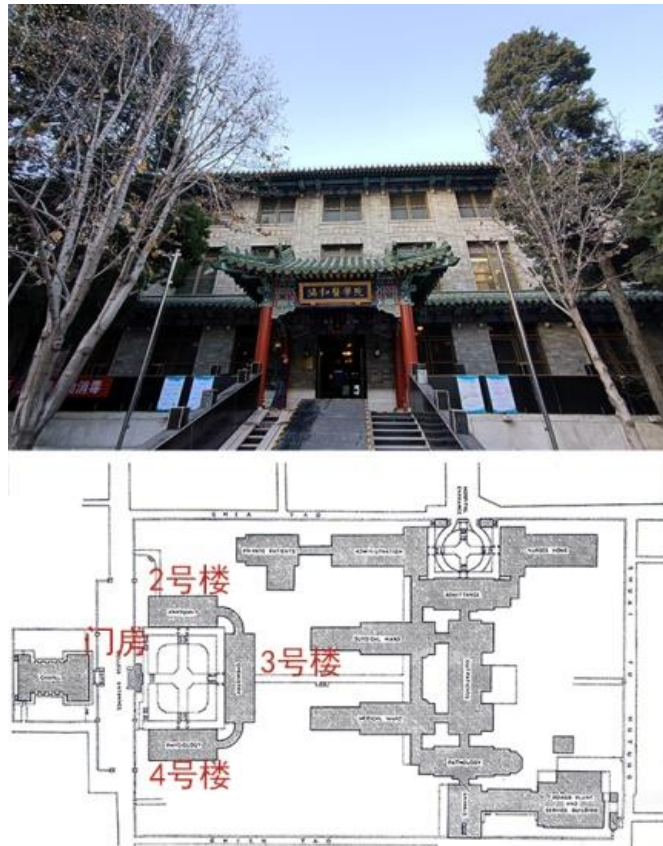


Figure 1. Union Medical College buildings and overall layout Clockwise: Building 2, Building 3, and Building 4.

Peking Union Medical College building has a long history, with outstanding architectural features, preserving the historical pattern and characteristics of the times. Its architectural construction is in the exploration and practice stages of modern Chinese eclecticism. While adopting advanced Western design ideas in the architectural layout, space design, decoration, and construction, it also integrates the traditional Beijing style into them. The design of the whole building embodies the ideas of functionalism and modernism, and its architectural form is an organic combination of both traditional Chinese culture and modern Western design.

2. Construction history

At the end of the 19th century and the beginning of the 20th century, there were many architectural design schools in the United States and advance technologies. The second industrial revolution brought about the “Electrical Age.” As a result of various medical equipment, the architectural design requirements were higher. The rise of Chicago School in the United States compelled the construction industry and the German Manufacturing Alliance to pay more attention to functions and vigorously advocate industrialized buildings, respectively. Medical buildings require special designs due to their functions.

Before mid-19th century, most Western doctors believed that the air was what spread or even caused diseases. Even if the air quality is good in places where patients gather, such as hospitals, the source of disease can still be retained in building materials^[2]. Hence, it is best to use impermeable materials for indoor application. At that time, the hygiene requirements of medical buildings had set them apart aesthetically from other building types; medical buildings were designed for therapy and occasionally for aesthetics. For example, Roxbury’s New England Women’s and Children’s Hospital used rounded corners to facilitate air circulation and ensure sanitation, with no extra decorations and only a few furnishings and furniture. The ward faces and furniture are white to make sure that dirt does not get hidden by the color^[3]

Early Chinese hospitals, however, were built by missionaries, who preached in the form of charitable diagnosis and treatment, and most of the medical buildings were full of religious overtones. For example, Guangzhou Boji Hospital initially could only rely on commercial activities for diagnosis and missionary work, and there were huge challenges in fund preparation and technical equipment ^[4]. The interior decoration of the operating room of Guangzhou Boji Hospital (**Figure 2**) was not as elegant as that of Western hospitals, and the medical cases were often straightforward ones.



Figure 2. Operating room of Guangzhou Boji Hospital.

At the end of the 19th century, American medical practitioners gradually accepted Lister's germ theory and began to realize that it was the microorganisms floating in the dust rather than the air that caused the spread of diseases ^[5]. Given the concern toward sterility of medical environments and equipment, designers attempted to create a space that could be disinfected and began using waterproof, fireproof, soundproof, and corrosion-resistant building materials and finishes that met the needs of the time. They further strengthened the requirements for interior details, such as rounded corners, seams, and protrusions. However, in ordinary medical teaching places, wards, and other spaces, the requirements for impermeable indoor materials are not as high because the indoor moisture would condense on waterproof materials and deposit a large amount of bacteria and viruses.



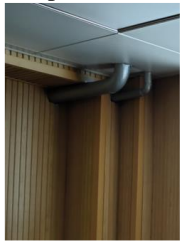
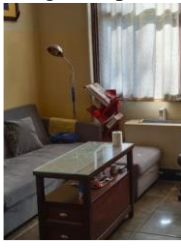

At the beginning of the 20th century, Western medicine was the means of missionary work by the early church, but the Qing Dynasty banned Christian missionary work. As a result, European and American churches learned the lesson of "conflict between people and religions," and thus adopted a large number of traditional Chinese architectural elements in the appearance of buildings to strengthen the "localization of Christianity" ^[6]. Peking Union Medical College combined Western medicine with Chinese civilization, hoping that the Chinese people may learn to accept Western medicine. Peking Union Medical College received special attention from The Rockwell Foundation and "borrowed" from Johns Hopkins University in terms of its overall layout and teaching ^[8]. In addition, American technology was adopted in most of the design and construction of Peking Union Medical College, while its appearance predominantly reflects traditional Chinese architecture. After He Shi designed the general drawing and building plan and elevation of Phase I Project, he sent the design drawings, including the structure, equipment and building construction details, back to the Chicago office for improvement, and subsequently modified the construction with regard to the actual situation of the project ^[8].

3. Current status of interior decoration

Peking Union Medical College building has been in use for a hundred years since its completion, which has already exceeded the 50-year service cycle of general building structure safety design. Although it has been repaired and protected many times, it is damaged by various factors during the use process, and the

original appearance of the cultural relic has also changed tremendously during the repair process. Following on-site investigation and comprehensive research, the main reasons for the damage of this cultural relic are attributable to three aspects (**Table 1**).

Table 1. Current practices and damage survey of Peking Union Medical College building

Building part	Ground and baseboard		Wall		
	Original material replacement	Surface damage	Original material replacement	Original paint color design simplified	Skin paint damage
Damage type					
Current situation and location	 Corridor on the first floor of building 4	 Office 1–4 on the first floor of building 4	 Farewell room, B1, building 2	 2–5 on the second floor of building 4	 Lower ground floor of Building 2, building 3
Current status, basic practices, and damage	The original terrazzo floor and skirting line were changed to black tiles	Damaged surface material	Wood veneer is applied behind the wall	In the later stage of wall maintenance, the original decoration was simplified, the paint was changed to light yellow, and the waistline was omitted	The wall skin is damp and peels off
Damage cause analysis	Human factors	Natural factors	Human factors	Human factors	Natural factors

First, natural factors. After a hundred years of wind, sun, rain, weathering, seasonal freezing, structural aging, *etc.*, problems including the decay of wooden components, hollow plastering of walls, molding, weathering of stone cultural relics, cracking and alkali weathering of wall bricks, partial decay of doors and windows, corrosion and damage of detailed components, *etc.* are evident.

Second, human factors. Due to the needs of use functions, improper interventions that can damage the value of the cultural relic have been carried out, and due to difficulties in management, maintenance, and funds, the management and maintenance of the building have not been in place, thus further aggravating the architectural diseases and resulting in an aggravated damage to the authenticity of the original site.

Third, design constraints of the historical period. Peking Union Medical College building was built a hundred years ago. According to the engineering practices, quality requirements, and materials at that time, the stressed components of the building were lower than the requirements of the existing codes in terms of structural strength, deformation, and stability.

4. Characteristics of interior decoration art

He Shi designed according to the latest hospital specifications in the United States and sent the design drawings back to the Chicago office to improve on the details. At that time, the American design style and technology were adopted for its interior decoration ^[7]. As shown in **Figure 3**, the interior decoration of

Ward 2 of Brigham Hospital in Boston in the 19th century was layered with paint colors and designed with a waistline. With the development of social productivity, the constant temperature room in Peking Union Medical College is rarely used, and its interior decoration remains the same. The old photos of the Parasitology Laboratory in building 4 show that the interior decoration of American medical buildings is still used.



Figure 3. Interior decoration of Peking Union Medical College and interior decoration photos of American hospitals at the same period. (a) Interior decoration of Ward 2 at Brigham Hospital. (b) Historical photo of the original board room in Building 3. (c) A historical photograph of the parasitology laboratory in Building 4. (d) Photo of the thermostatic chamber on the first floor of Building 3. (e) Interior baseboard decoration method.

In order to create a sterile environment, the room needs to be frequently cleaned and disinfected. Restricted by the technology of the times, terrazzo, marble, cement, and other materials are often used as building interiors for high-strength anti-corrosion requirement. Historically, in terms of interior color and material matching, the decoration of the interior skirting line of Union Medical College building is mostly consistent with the materials used on the ground. At the same time, in view of the function of the room, terrazzo is used for the floor and the baseboard as an anti-slip treatment in the laboratory; in the library and important offices, the indoor baseboard and furniture cabinets are combined, as shown in **Figure 3E**. The activity requirements for interior arrangement are no longer as harsh as in the 19th century.

Although the style of decoration in most rooms changed during later maintenance, historical evidence can be found from old photos of a few reserved rooms and wall foundations. The wall color of some rooms is light yellow, whereas that of key rooms is red. Meeting rooms, boardrooms, and other important public rooms such as libraries have more prominent colors and decoration materials. The original director's room (**Figure 3B**) is the first room located in the southwest corner of building 3. The upper wall of the dado is dark, the top surface is white, and the wall is transitioned with plaster moldings. The paint that was repaired later was removed during the investigation. It was found that the wall bases of many rooms decorated with wooden dados were in palace wall red, so it is speculated that palace wall red was used for the original wall decoration.

Although most of the rooms and some indoor thermostatic rooms are painted, they are delicately handled in terms of color and visual division. Buildings 2, 3, and 4 are mainly laboratories and offices; they have simple decoration styles and the same color scheme for their walls. As shown in **Figures 3C–D**, a darker khaki was used for the lower part, light yellow was used for the upper part, and a lighter white was used for the ceiling. A brown waistline divides the wall, and the transition between the two colors is seemingly natural. The construction requirement of the overlapping parts of the two colors on the wall is unnecessary with the waistline design. In some rooms, a thin waistline is designed under the thick waistline to reduce the visual impact of the thick waistline. In other rooms, only a light-yellow base is seen after

removing the topcoat. It is speculated that some rooms are relatively simple and only use light yellow paint for decoration.

In view of the long history of the capital city of Beijing and the strong traditional concepts of the people, the design of Peking Union Medical College does not blindly imitate the design of American medical buildings or royal palaces. At that time, the facade of the building was in a plain color style of blue bricks of Beijing courtyard house, the roof was made of royal green glazed tiles, and the exterior decoration was decorated with colored paintings. Due to the special architectural functions of the medical school, the interior decoration is simple, but it still retains Chinese characteristic elements. The interior of Peking Union Medical College library retains the royal vermilion, while the darkroom, storage room, professor's studio, and other rooms with low hygiene requirements are covered in yellow paint. The building, as a whole, not only retains the traditional Chinese architectural style, but also incorporates American architectural design concepts, thus making it easier for Chinese people to accept Western medicine.

After the Opium War, Western culture began to invade China. Designers began to think about the differences between Chinese and Western cultures and the progress of the Western technology era, and actively explored new creations of traditional Chinese architectural forms. Whether it is the architectural appearance or interior decoration, it is a witness of the cultural exchange between China and the West. Paul Monroe, one of the original proponents of Peking Union Medical College construction project, proposed during the project inspection that newly built schools in China should combine Eastern and Western cultures and learn from each other, steering clear of the appearance of buildings transplanted from abroad [8]. The construction of Peking Union Medical College reflects the change of social consciousness in the early period of the Republic of China and the emancipation of people's minds. It also reflects the combination and development of traditional Chinese architecture and Western architectural technology as well as the various influences brought on by the aggressive forces in China.

5. Characteristics of interior decoration technology

5.1. Indoor fillet treatment

The sterile environment required by medical care has strict requirements not only on indoor walls, floors, ceilings, *etc.*, but also on movable furniture, medical equipment, *etc.* Rather than breaking down the traditional link between the built environment and disease incidence at that time, hygiene concepts and germ theory simply reinforced the link between hospital building materials, design, and hygiene. In order to create a better aseptic environment, materials such as polished lacquered wood, marble mosaics, and glass are extensively used in the aseptic environment required by the hospital. In the late 19th century, New York hospital directors tested certain building materials to determine the least absorbent ones to reduce the risk of retaining infectious materials. Lime and white mortar proved to be the least absorbent materials for walls at that time, while terrazzo was used for floors [3]. Most of the finishes and furniture of the wards are made of smooth and hard materials, with no extra decoration used. In addition, most of the indoor corners and corners are rounded to facilitate air circulation and cleaning.

Union Medical College adopted the idea of creating a sterile environment like American medical buildings at that time, but because it retained the characteristics of traditional Chinese architecture, a lot of wood is used. It may also be due to the dry climate in Beijing and the low possibility of bacterial growth and retention. Moth-proof and water-resistant teak is used for the external purlins and dougong, while economical oak is used for the interior floors and furniture of the professor's studio and library. As shown in **Figure 4**, the external and internal corners of the interior walls are rounded, unlike today's streamlined interior design, where the mortar on the wall surface is treated with arcs to soften the space. In addition, the junction of the skirting line, the wall and the ground, the window sill, and the corners of the furniture are all treated with arcs for convenience of sanitation and cleaning as well as the prevention of dirt accumulation.

Considering that high places such as high window sills and furniture tops are not easy to clean, the top plane is inclined to minimize the amount of dust accumulated.



Figure 4. Indoor fillet treatment of Peking Union Medical College. (a) The circular arc treatment of the inner wall exposed corners. (b) Arc treatment of indoor exposed corners. (c) The sloped treatment of indoor windowsills. (d) Tilt treatment of furniture tops.

5.2. Sound insulation and heat preservation treatment of the walls

During the interwar period, due to rapid industrial development, urban noise, and high building density, the space function design of American hospitals is ingenious; the functional requirements are carefully matched with the wall and floor materials; and hygiene, cleanliness, acoustics, fire protection, and so on were considered in the design. In the early 20th century, Stevens designed the soundproof wall “Stevens System” for Royal Victoria Hospital (**Figure 5A**). The walls use hollow bricks for sound insulation and keels to create the air layer and the outer veneer layer. They are then filled with felt and other materials to enhance the sound insulation effect. He also recommended thick felt-wrapped pipes and vents and acoustic plaster mortar on the interior walls [9]. In consideration of fire protection in the design of hospitals, architects usually choose to use fire-resistant materials, such as hollow clay tiles, bricks, stones, and concrete floors. Even old buildings have undergone modern fire protection improvements [10].



Figure 5. Wall section of the American hospital and the sound insulation and heat preservation treatment of the wall of Peking Union Medical College during the same period. (a) The soundproof wall “Stevens System” for Royal Victoria Hospital. (b) The wall of the thermostatic chamber on the first floor of Building 3. (c) The wall of the laboratory on the second floor of Building 4. (d) The floor of the laboratory on the second floor of Building 4.

Union Medical College is located in Prince Yu's Mansion (**Figure 6**). To its south is the embassy area of Dongjiaomin Lane, a commercial trade area, which is surrounded by a large number of foreigners. The surrounding area of the base has a huge population, with dense buildings and mixed noise, so the need for fire prevention, sound insulation, and heat preservation has been taken into account by the designer. Since the blue brick masonry technology that is used in traditional Chinese buildings cannot meet the requirements, blue bricks are built as the outer layer of the wall, the interior is filled with thermal insulation materials, and hollow bricks are used to build the inner walls to achieve the purpose.



Figure 6. Site selection for Union Medical College Phase I Project. From top to bottom, the Forbidden City, Dongan Market, Wangfujing business District, Dongdan Cuisine Market, and the foreign diplomatic quarters are shown.

As shown in **Figure 6**, there are rooms with special needs. In order to configure a constant temperature room, special insulation materials are placed inside the brick walls, and asphalt and other materials are used to fill the joints. The walls of ordinary offices, laboratories, and other rooms are filled with hollow bricks. Moreover, the floor of the laboratory is made of several layers of hollow bricks. Historically, the experimental electrical equipment penetrated the floor directly, and the suspension bars were anchored directly to the floor of the upper floor, which to a certain extent destroyed the original intention of its fireproof and soundproof design.

Detailed-orientated humanistic care is evident in details such as sanitation, color, acoustics, and heat insulation in interior decoration. In order to meet the requirements of building sanitation and medical experiment teaching, He Shi kept architectural decoration and details to a minimum and was extremely restrained in aesthetics. However, interior decoration and details are still necessary elements of medical architecture to some extent. Considering the iconicity of the entrance of Union Medical College, the main entrance hall of the building complex is decorated with wood as a whole, with dignified and elegant wooden screens arranged. Considering the potential impact on students and professors, the teaching space is not pursued to be purely hygienic, but it is completely painted in white. The library and other rooms are not

only decorated with wood, but also painted with royal vermilion. Considering the impact of the surrounding environment of the base on teaching itself, the acoustics and thermals are extremely sophisticated. Being people-oriented by taking into account of the needs of all users is one of the ways for Chinese people to recognize and learn Western medicine.

6. Conclusion

The interior decoration of Peking Union Medical College building embodies the medical aesthetic culture during the early Republic of China, the ideological emancipation brought about by the colonial aggression forces, and the organic combination of local history and culture with Western technology. He Shi combined traditional Chinese architecture with advanced Western technology and design trends, which weakened the psychological resistance of the Chinese people and spread the theoretical knowledge of Western medicine. It is also one of the exploration forms of traditional Chinese architectural styles. This paper analyzes and summarizes the characteristics of the interior decoration of Union Medical College Phase I Project, providing a research perspective for the architectural practice of foreign architects in China and into the decoration characteristics of domestic medical buildings in the late Qing Dynasty and early Republic of China.

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Disclosure statement

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