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The Chinese Cultural Center at Greenwood Park (Des Moines, Iowa) integrated into a landscape design: a reflection of Chinese culture in contemporary western architecture

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The Chinese Cultural Center at Greenwood Park (Des Moines, Iowa)
Integrated into a Landscape Design:
A reflection of Chinese culture in contemporary western architecture

by

Bin Hu

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of the
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MASTER OF ARCHITECTURE

Major: Architecture

Signatures have been redacted for privacy

Iowa State University
Ames, Iowa
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CHAPTER 1. INTRODUCTION

Intention

The intent of this thesis is to identify and incorporate fundamental principles and elements of Chinese traditional architecture in a design of the Chinese Culture Center in Des Moines, Iowa. Chinese cultural background and architectural development will be introduced and relevant Chinese philosophical and traditional methods will be implemented to develop the building concepts. This will be done by reviewing the historical and contemporary context and the architectural interaction between East and West. The relationship between architecture and Chinese culture will be outlined through history, tradition, technology and aesthetics.

The building site is located at Greenwood Park in west Des Moines. The site is selected because of its environment and its proximity to the metropolitan area. The Chinese Cultural Center will be built south of the Des Moines Art Center where Western arts are normally exhibited. In combination, a cultural area will be provided where people can appreciate both Eastern and Western culture so as to better understand them. Also, Greenwood Park provides such a wonderful background to create a landscape for the building.
Problem Statement

The Chinese Cultural Center will provide a building design by using new materials, method and technology with traditional influence from Chinese architectural principles. It will create an efficient and well organized cultural facility by combination of aspects of function and aesthetics. It will also generate a harmony between architecture and environment. A cultural atmosphere can be established in the Greenwood Park area by incorporating the existing Des Moines Art Center and the Des Moines Center of Science & Industry.

The following issues will be considered in the design. First of all, the natural site will be used to benefit the building environment in terms of existing topography, water and vegetation. Meanwhile, the construction will be integrated into the landscape. Secondly, the building will be organized to achieve harmony of function and aesthetics by providing the most efficient services and an attractive appearance. Thirdly, the building will be presented with its distinctive personality and character by implementing Chinese principles and integrating them with the Western environment. And fourthly, structure and materials will be utilized in accord with appropriate simplification of traditional structure and elements.

For the purpose of this project, it has been assumed that a private foundation is going to be set up to contribute to the development of international cultural exchange in Iowa. The building will serve as the cultural center to introduce the Chinese culture and art to both Oriental and Western visitors. It will also provide a place for scholars, artists and students to study Chinese issues. It will be built to disseminate and develop the culture between East and West, and help Western visitors to better understand Chinese culture. Greenwood Park is available and suitable for this
investment and the building will be a visible and accessible focus in the park.

Methodology

The procedure of the design involves information gathering, information interpretation, design interpretation and discussion, design proposal, and evaluation.

As the foundation of the design, Chinese historical background, architectural development and principal philosophy are reviewed and studied, Chinese and Western issues compared.

The site is studied by direct observation supplemented with written and visual information including photographs. Aspects include site boundaries, legal requirements, topography, soil, water, vegetation, temperature, precipitation, uses, circulation, access, and neighboring uses.

Design program, site selection, and building pattern are developed in terms of cultural and physical information. Design concepts and principles are established based on analysis and interpretation of collected information.

Certain alternatives of design are considered with the optimum scheme taken into development. Site utilization, building layout, space organization, shape and form, structure and material, circulation, and landscape design are developed and presented.

The building design is evaluated to determine if it has demonstrated implementation of Chinese culture and whether the design has achieved the original purpose and satisfied both functional and aesthetic demands.
CHAPTER 2. BACKGROUND

This chapter reviews Chinese historical background, cultural influence, architectural development, structural system and fundamental philosophies. These principles and elements will form the foundation for the architectural design of the Chinese Cultural Center. It also provides the basic outline of Chinese culture and architecture for later design concepts. Study of previous examples of Oriental influence in Western architecture and comparison of Chinese architecture and Western architecture illustrate the similarity and the diversity between Eastern and Western architecture.

Historical Development of Chinese Architecture

The history of Chinese architecture is through the evolution of thousands of years. In 221 B.C., the first emperor of Chin dynasty, by conquering the other six states, founded the first centralized feudal empire in China. Since then, large scale of building activities had begun. Roads were improved, and the Great Wall was built to defend invasion from Mongols.

After Chin dynasty, the basic architectural system was established in Han dynasty (206 B.C.-220 A.D.). With the rapid growth of economy and technology as well as the wide spread of education, not only the architectural construction, but also the building types and styles had been substantially developed and enriched. Palaces,
temples, tombs and gardens had widely emerged in the capital of Chang-An. The timber framing technology had begun to be used in the construction of upper stories instead of the single story structure.

From then, the development of architecture had reached a climax and maturity during period of Tang-Song dynasty (618 A.D.-1279 A.D.). Achievements were distinguished in aspects of urban planning, timber construction, brick and masonry building, architectural decoration and technology.

Chang-An, the capital of Tang, was one of the most magnificent and organized city in the history. The Ta-Ming palace in Chang-An occupied the area of two times larger than the one of Forbidden City built in Ming and Ching (see Figure 2.1). The organization of the building group had also approached maturity. The layout of building complex focused on making use of the natural terrain; emphasizing the contrast and the spatial changes on the axial orientation.

Timber structure had been standardized and constructional technology had been improved. Progress of the frame and column system provided freedom for buildings in large scale and massive space. Architectural decoration presented the feature of being natural, bright and simple.

During the Song period, Ying Tsao Fa Shih, which was compiled by Li Jie and published in 1103 A.D., contributed greatly to the building construction and architectural development. It was the most systematical and comprehensive manual of national building standards, containing detailed design principles of thirteen types of buildings, their modular dimensions, their construction methods, material quantities, and design patterns. Rules and techniques for the construction of each building and each component were set down after the material, structural and aesthetic factors
had been analyzed. The book is not only a rare literary source on classical Chinese architecture, but is also a summation of building technology of the middle period of the feudal society.

Ming dynasty (1368 A.D.-1644 A.D.) was the most vigorous period in the evolution of buildings, almost all actual masterpieces of Chinese planning and architecture appeared since then. Some distinct changes in style and expression had taken place. There was a greater monumentality, greater use of brick and solid masonry, a greater simplicity and horizontality in overall shape, and a greater symmetry and formality. Private gardens had emerged prosperously in southern China.
“In the style of individual buildings, some of the changes can be seen by comparing the lines and proportions of the Song hall and a typical Ming hall (see Figure 2.2). The roof had become higher and steeper, the ridge and eaves lined straighter and more mechanical. The columns had therefore become equal in height. The columns had also lost their slight taper and entasis, the overhang was considerably reduced, and the bracket system, instead of visibly throwing out the eaves over the columns, with lesser bracketing or none in between, forming a rhythm corresponding with the points of support, was reduced to a delicate scale and an even size, running continuously over columns and beam, separating rather than joining roof and columns. The horizontal emphasis was further increased by the lateral bracketing pieces attached to the sides of the columns under the tie beam” (Boyd, 1987).

Since the severity of the feudal autocracy, the progress of architecture in Ching dynasty (1644 A.D.-1911 A.D.) had relatively declined. Building styles mainly followed the Ming tradition. Imperial gardens, however, had reached the climax. The quantity and the immensity of the volume were incompatible with any other periods. At the meantime, residential buildings had been greatly enriched and developed.

**Cultural Background**

Architecture comes from its culture and culture is the source of architecture. For the purpose of better demonstration and analysis of the Chinese architecture, this section will provide a brief introduction about the Chinese cultural background which is related to the philosophies of Confucianism and Taoism, the concepts of yin/yang and Feng Shui.

By the time of the sixth century, two complementary philosophies: Confucianism
Figure 2.2: The Comparison of the Song Hall (upper) and Ming Hall (lower) (Boyd, 1987)

and Taoism, had developed in ancient China. That was the period of the “hundred flowers blooming” and the “hundred opinions contending.”

Confucianism was the philosophy of social organization, common sense and practical knowledge. It provided the Chinese society with a system of education and with strict conventions of social etiquette. Taoism, on the other hand, was concerned primarily with the observation of nature and the discovery of its way. Human happiness could be achieved when one followed the natural order and trusted his intuitive knowledge.

“While Confucianism was conservative, paternalist, rational, conformist, vener-
ating precedent, ceremony and hierarchy, perfectly adapted to become the orthodoxy of a bureaucratic empire, Taoism was anarchical, mystical, anti-rational, experimental and popular, venerating nature and teaching the contemplation of nature” (Boyd, 1987).

The two trends of thought represent opposite poles in Chinese philosophy, but they were always regarded as poles of one and as complementary to each other. Both of them had crucial influence on the Chinese thought, art and culture.

The idea of Confucianism has been widely adapted to the design of imperial buildings, residential houses as well as city planning which consists of symmetric axis, unified layout and rigid hierarchy. Contrarily, the Taoist thought has a major impact on the design of private gardens which traditionally has the diversity of layout, and the feeling of poetry and nature (see figure 2.3).

Yin and yang is the fundamental concept of Chinese thought derived from the Chinese contradictory and complementary philosophy as discussed above. “The original meaning of the words yin and yang was that of the shady and sunny sides of a mountain.” “Yin was the complex, female, intuitive mind, yang the clear and rational male intellect. Yin was the quiet, contemplative stillness of the sage, yang the strong creative action of the king” (Capra, 1985).

These two archetypal poles of nature represent bright and dark, male and female as well as dominating and yielding. It can be interpreted into the following concepts:

“In order to expand a thing, one should surely contract it first.

In order to strengthen, one will surely weaken first.

In order to overthrow, one will surely exalt first.
Figure 2.3: Examples of Architectural Implementation of Confucianism and Taoism
(Pan, 1982)
In order to take, one will surely give first” (Capra, 1985).

These concepts have been widely used in the Chinese architectural designs. For instance, at the entrance of the residential house, a wall is always set to reveal the attractiveness and mystery by concealing sights behind. The same idea is also applied in the garden designs. Visitors can get an unexpected view by accessing the spacious area through the narrow, curved path.

The use of contrast in buildings also comes from the concept of yin/yang. Such as solid and void, straight and curve, bright and dark, rough and smooth, as well as dynamic and static. By means of it, the visual effect and the aesthetic value of the building can be enhanced.

The dynamic character of yin and yang can be illustrated by the ancient Chinese symbol called “tai-chi tu” or, “diagram of the supreme ultimate” (see Figure 2.4).

“This diagram is a symmetric arrangement of the dark yin and the bright yang,
but the symmetry is not static. It is a rotational symmetry suggesting, very forcefully, a continuous cyclic movement" (Capra, 1985).

The pair of yin and yang is the grand motif that permeates Chinese culture and determines all features of the traditional Chinese way of life. As Chuang Tze said, "Life is the blended harmony of the yin and yang."

Feng Shui is a traditional Chinese technique which aims to ensure that all things are in harmony with their surroundings. It is to establish the yin/yang principle at site based on the theory of cosmology and astrology. It concerns the elements of nature including sun, moon, earth, hill, water and vegetation, and emphasizes the importance of the shapes and contours of the landscape. The term Feng Shui means "wind and water."

"Dragon and tiger are key symbols to a site's Feng Shui. The terms dragon and tiger are taken from Chinese astronomy, which divides the heavens into four great constellations: the Green Dragon of the East, the Red Bird of the South, the White Tiger of the West, and the Black Tortoise of the North. ... All residences are honorable with southern faces which have on the left flowing water, representing the Green Dragon; on the right a long path, symbolizing the White Tiger; in the front a pool, for the Red Bird; and at the back a hill, the emblem of the Black Tortoise" (Walters, 1988).

"The principle of the Five Elements, Wood, Fire, Earth, Metal and Water are considered to stimulate and shape all natural and human activity. Buildings, whether of modern or traditional design, can be classified according to the Five Elements, following the same general principles that apply to the contours of the landscape. Thus, sharply pointed roofs belong to the Fire Element; low, flat roofs to Earth
Element; domes, to metal; irregular shapes to Water, and tall, narrow constructions to the Wood Element. The significance of the Element type is of further importance when relating the building to its environment” (Walters, 1988) (see Figure 2.5).

Feng Shui stresses the breath of nature which is called “chi”. “Chi” can bring people with good health, fortune and prosperity. An undulating landscape is usually regarded as an auspicious area, that is, the breath or essential currents produced by the folds of hills. Water to the south of a site, flowing calmly, is regarded as very favorable, as it brings wealth.

Since Chinese culture and art is a kind of symbolism, the architectural symbolic language is developed to represent ideas, character, spirit and feelings.

Chinese architecture in essence symbolized many levels of meaning: axial and symmetrical planning expressed ethics and ritual; orientation and Feng Shui depicted deeper religious meaning; the form of an individual structure characterized the Chinese spirit; while private garden planning expressed a philosophical content.

Harmony and unity can be found in the appearances of Chinese buildings – in the harmony of spiritual needs and physical environment, in the unity of materials, construction, function and form.

In short, architectural symbolism creates a dialogue among man, architecture and nature. Through this, man can understand the architecture and experience the nature. Symbolism is an intrinsic part of ancient Chinese culture.

Structure, Form and Elements of Traditional Chinese Architecture

The basic structure of Chinese architecture is the timber frame system. This is quite different from the function of masonry and brickwork in the West.
Figure 2.5: Lo-Pan, a Tool to Judge Feng Shui (Walters, 1988)
Timber as a material is light for its strength, cheap to transport, easy to work and to carve, easy to mass produce and to standardize. Separating from elements of the enclosure, columns provide wide spans, supports of small plan area, a freedom in planning, and a flexibility in use.

Timber construction is the "void" frame. Columns which are tied in both directions by beams frame the building and carry the loads of beams, floors and roofs. "Solid construction" is the screen walls which carry no load bearing and function as the moveable enclosures. Internal partitions are commonly framed up in timber and not always carried up to full height.

The design flexibility of the timber structural system can be attributed to its several inherent advantages. Firstly, its column grid can be varied, allowing omission or shifting of column supports in planning, the width of bays and floor heights are also variable to satisfy different functional demands. Secondly, its use is not confined to single story buildings, but is adaptable for multi-storied structures as well. Thirdly, because of its frame construction, its perimeter enclosures can be freely located, varied in thickness, and may be either enclosed or open. Because of its high adaptability, this system has continued to be useful for several thousand years throughout the long history of Chinese architecture. Such 'longevity' is rare among structural systems anywhere in the world (see Figure 2.6).

Tou-kong is the most unique and striking feature in Chinese timber structure. "It is basically composed of two different types of structural elements. The first, a block placed on top of a column called ‘tou’, looks like a capital. Above it, and transverse to the direction of the depth of the building, are bow-shaped elements called ‘kong’ placed on smaller wooden blocks called ‘sheng’. No nail or glue are used, as both
tou and kong are assembled by mortice and tenon joints. This combination is called tou-kong" (Liu, 1989). The cluster of cantilever tou-kong are used to carry the eaves as far out as possible and perform as the decorative purpose (see Figure 2.7).

There are four basic roof types used in ancient China. The hipped roof is the most dignified type which is applied only to the important buildings. The roof form essentially includes one main ridge and four sloping ridges and is characterized by an inward curve and upturned corners. The half-hipped roof is mainly used in buildings of secondary importance. It consists of a hipped roof surrounded by a peristyle and has nine ridges instead of five. At each end of the gable is an eave board and Xuan Yu (hanging fish) Ru Yi (symbol of happiness) decoration. The gabled roof is widely
used in less important buildings such as the house of the common people. There are two types: one hangs over the end of the wall and another is flush with the wall. The conical roof is unique in that it can be placed on top of almost any compact, symmetrical building plan of square, hexagonal, octagonal or circular form. It is used in pavilions or tall buildings. The top of the roof is sometimes flattened and called Lu Ding roof (Liu, 1989) (see Figure 2.8).

The basic building elements of traditional Chinese architecture are the hall, pavilion, gallery, terrace, balustrades.

The hall is the standard unit of Chinese architecture, used equally in temples, palaces and ordinary dwellings. It has a southern aspect and is rectangular in plan. Walls play no part in supporting the structure. The hall is divided longitudinally by rows of columns. The grouping of halls form the large scale of Chinese planning (see Figure 2.9).
5. Conical Roof (Square)  6. Conical Roof (Circle)  7. Lu Ding Roof

Figure 2.8: Roof Types of the Chinese Traditional Buildings (Liu, 1989)

Pavilions differ from halls in being smaller, square on plan and without any wall filling. Based on the square plan, other symmetrical forms may be developed, such as the hexagon, octagon, fan, and etc. (see Figure 2.10). They are usually erected to decorate the landscape gardens and exhibit the variety in form, use and grouping. They are one of the most charming viewpoints in the garden.

Galleries serve as the connection of the various architectural structures. It can be considered as the transition between the solid and void space. They are the part of the magnificent scenic features in the Chinese garden and provide a comfortable
Figure 2.9: Column Layout of Chinese Halls (Li, 1985)
shelter for the viewers to appreciate the constantly changing quality and beauty of the scenes (see Figure 2.11).

The terrace was developed from the altar which originally functioned as the religious platform for offering sacrifices to the God of the Earth, the Sun and the Moon. It has incorporated in the design of all Chinese buildings as the base to have the main hall stand. "From records we learn that nine feet was the prescribed height for a platform under an Imperial dwelling, seven for that of a prince, five for an
official and three for a scholar." The terrace is always approached either by one flight of steps or by a ramp carved with a dragon motif and flanked by steps on either side (Harris, 1947).

Balustrades are used to surround the terraces and balconies, and decorate the landscape buildings. It can be made of wood and stone. The standard type has the sculptured finials, ornamented slabs at the bottom and a railing at the top. The variety of pattern and style expresses the poetic quality of Chinese architecture (see Figure 2.12).
Spatial organization in classical Chinese architecture is based upon both aesthetic requirements and daily needs of the people. The basic concept involves the use of “jian” as a standard unit which may be expanded and repeated to form either individual buildings or groups of buildings. Jian is a rectangular space defined by walls and columns which separate it from adjoining spaces. Jian can be extended to form a hall by continuing the standard unit along the vertical and horizontal axis. A longer axis can be used to connect halls to form a building, or even a city. Sometimes halls are grouped around a courtyard to form different types of building combination. Thus, the Chinese organization of space expands from a cell to a group, and from microcosm to macrocosm (see Figure 2.13).
Figure 2.13: Development of “Jian”
Over thousands of years of evolution, Chinese architecture creates its own distinctive characteristics and styles in terms of form, color, ornamentation, and the ordering of space.

A major feature is its integration of artistry and function, materials and structure. Raised terraces guard against dampness, large eave overhangs shelter against rain, lattice on windows and doors facilitate the mounting of paper to admit light, and decorated tiles are an integral component of roofing materials. Decorated corbel brackets, architrave tie ends, steps and door nail studs are all functional components of the structure not superfluous adjuncts. Architectural beauty is inherently generated from the functional needs.

Cities, Dwellings and Gardens

Chinese cities are designed with a grid plan and enclosed by walls. The city exhibits axial symmetry and has gateways opened to all four directions. The palace is located at the center with the imperial court in the front, and the market to the rear. All major buildings face south. Roads are laid out running north-south and east-west, forming a checker-board grid (see Figure 2.14).

The Chinese courtyard house embodies the ethical thought of Confucius. All the halls and courtyards are placed along a longitudinal axis in orthogonal order. By following the path, one can experience the continual contrast between solid and void of the building; the consistency and unity of the interior and exterior spaces.

The courtyard is the open space to the members of the house and hold all kinds of activities, but it is completely closed against the outside. The feature of the opening and enclosure creates a harmony and intimacy in the family and avoids the
interference from the outside world. The courtyard also works as the function of circulation and contact (see Figure 2.15).

"The architectural space is like a series of closed world, of complete independent, progressively smaller units – from the town to the private house – which repeat on a reduced scale the forms of the larger units. A house may be viewed as a town in miniature; the town as a house on a vast scale. This conception matches on the moral and social plane the supreme importance of balanced overlapping relationships between individual and family, human order and cosmic order" (Pirazzoli-t’Serstevens, 1971).

The traditional Chinese garden is held in high esteem in the Chinese history of culture, art and architecture. The duality of Confucianism and Taoism is clearly
expressed between Chinese houses and Chinese gardens in the relationship of contradictory and complementary. "The house and the city were ruled by Confucian ideas, formality, symmetry, straight lines, a hierarchy of importance, clarity, conventionality, a man-made order. The garden and the landscape were formed by typically Taoist conceptions, irregularity, asymmetry, curvilinear, undulating and zigzag forms, mystery, originality, the imitation of nature" (Boyd, 1987).

Buildings usually play significant roles in Chinese gardens. They function both as viewing points and as parts of the garden scenery. They present small sizes in group
compositions and cluster into the natural landscape. The integration of architecture and nature is one of the achievements of Chinese tradition.

The Chinese garden reflects the original symbolic meaning of the natural elements including mountains, lakes, and vegetation. The entire garden is a symbol of the universe by creating vastness of nature in miniature. It provides people with a viewable, touchable and livable naturalistic environment (see Figure 2.16).
Oriental Influence in Western Architecture

Oriental architecture and philosophy has been a major influence on Western architecture development. Back to 19th century, architects had searched a new approach and essence to express modern architectures instead of traditional European styles. Some features of Oriental architecture happened to meet this demand, such as the consistency of structure and form, the harmony of construction and landscape, and they had been taken into implementation. A critical event was the Japanese pavilion built in the World’s Columbian Exposition, Chicago in 1893. This building with typical Japanese style was recognized and appreciated. It represented a basic Eastern impact on Western architecture. Such influence can be obviously demonstrated in designs of Frank Lloyd Wright. Following are remarkable examples designed by him during early 1900s.

The Imperial Hotel in Tokyo was designed by Frank Lloyd Wright and finished in 1921. In his design, he tried to establish a modern building that respected Japanese tradition and fitted with indigenous architecture. The layout of plan had a traditional symmetry with an axial appearance, and the straight line and flat plane were modified with respect to the native style. The exterior of the building was a mosaic surface of brick and lava which was the material widely used in Tokyo. The building was designed through his deep understanding of Japanese aesthetics, with the purpose of being in harmony with its background.

There are clear parallels between Wright’s idea of the prairie house and oriental dwellings. The Japanese house with its sliding screens give a sense of open space like the effects achieved by his open floor plan. He also described the living space by citing the quotation from Lao-tze, a famous philosopher in ancient China, “The
reality of the building does not consist in the four walls and the roof but in the space within to be lived in."

George W. Smith House and William H. Winslow House were both designed in early 1900s located in Oak Park, Chicago. The former has the Chinese influence with its steep red roof and flaring eaves. The roof shape is repeated in the two arms of the L-shaped plan, on the two porches, and on the dormers. The exterior walls, sheathed entirely in wood shingles, flare out near the wall base making the house appear unified with its setting. The latter has the impression of Japanese temple with the symmetrical mass rising above its low pedestal. Its low roof line and wide eaves also reflects the Japanese influence.

Also influenced by Oriental architecture, the Fragrant Hill Hotel designed by I.M. Pei represented another approach. In this design, Pei tried to seek an enrichment and elaboration of modern building from traditional motifs and elements. The building has achieved success by combining Chinese tradition with modernization and incorporating architecture with landscape.

The Fragrant Hill Hotel was built in 1983. The site of the hotel is located in a public park 20 miles north of Beijing. The hotel relies on vernacular forms, historical traditions and use of local materials and decorations.

The main design principles are: "(1). Returning to the ‘root’. (2). Primary importance of environment. (3). Everything for people’s benefit. (4). Striving for beauty and attractiveness. (5). Emphasis on space and form" (Architecture, November, 1983). Pei tried to put these ideas into practice and create a high-standard hotel, with modern facilities, while possessing the traditional style of the Chinese nations.
Pei applied the Chinese traditional method of making gardens and borrowing scenery for a modern building; blending architecture with the environment and permeating the environment through the architecture. There was a strong north-south axial delineation through the central part of the plan which was consistent with classic Chinese architecture. The three wings, however, were asymmetrical and random, and defined a series of counts which were undulated by the natural topography.

Much attention has been paid to the method of “creating scene” or “borrowing scene.” The arrangement is so ingenious that everyone in the environment can enjoy infinite varieties of beautiful views. Hills and water play a significant role in creating a landscape with poetic and picturesque mood.

The entry on the north side of the property is through a commemorative gate or Pai-lou. The hotel is highly simplified, devoid of the characteristic ornamental brackets, curved roof, and buttress slabs. The decorative use of gray tile, originally inspired by early Chinese half timber and cantilever framing, surrounds six diamond-shaped windows above the entrance.

The Fragrant Hill Hotel is completed by reminding the Chinese of the intimate connection between gardens and architecture and combining Chinese tradition with modernization (see Figure 2.17).

**Comparison of Chinese and Western Architecture**

Based on the different culture and philosophy, Chinese architecture has formed its own styles and types distinct from the Western system.

Western thought has generally expressed the domination of man over nature. On the other hand, Chinese thought represents harmony between man and nature.
Figure 2.17: Plan of Fragrant Hill Hotel (Architecture, September, 1983)

Elements of nature are viewed as the spirits which assure life's necessary cycles, harmony between buildings and nature is the fundamental principle in the Chinese architectural design.

Western design emphasizes magnificence, greatness and domination of a single building. The building extends its space from single to multiple floor, from small to big size, and from ground to sky. All the using areas are generally organized within one building. On the contrary, there is no dominating center in Chinese building group and the single construction is relatively simple and standardized. Different functional spaces are placed in separate single buildings. Spatial expansion is from one to several buildings, from small group to big group. A group is one architectural
unit, and one building functions as one room specified in Western buildings. The design achieves its perfection and richness from organization between buildings (see Figure 2.18).

The basic structure in the West is masonry. Stone is the major material for the construction and it can last for a long period of time. Chinese architectural structure is the timber frame system. Utilizing wood as material provides flexibility of plan layout and possibility of being standardized.

The Chinese naturalistic garden and the Western geometrical garden are the two major garden systems. Western gardens are planned in axial and symmetrical layout with series of geometrically shaped parterres and rectilinear paths, assimilating a spatial structure of rooms and corridors in architectural design. Geometrical gardens of the West present a strong artificially created order in opposition to nature. The Chinese garden belongs to an entirely different school of thought, and it is a profound expression of Taoist natural philosophy. To follow nature's inherent laws and make the most use of them is the fundamental garden design principle. The Chinese garden has developed a unique pattern of irregular, asymmetric, curved, undulating lines, planes, and forms derived from nature. It conforms to the shape and natural configuration of the site. High density of architecture dominates most Chinese gardens (see Figure 2.19).
Figure 2.18: Comparison of the Western and Chinese Buildings (Li, 1985)
Figure 2.19: Comparison of Western and Chinese Gardens (Triggs, 1988)
CHAPTER 3. PROBLEM STATEMENT

This chapter presents the building type, the design program and site selection based on the study and analysis of Chinese architecture. This continues with discussion of form, structure, materials and landscape design. It focuses on incorporation of traditional ideas and modern technology, and harmony of Chinese architectural principles and Western environment.

Program Considerations

The Chinese Cultural Center is a multi-functional building which provides for the following activities: display of art, performance of traditional Chinese dance and theater, lectures concerning Chinese and American culture, study of art and culture, social gatherings and events, administration, and related activities.

The building is planned to accommodate a maximum of 300 persons for major events. It is assumed that larger activities may be accompanied in the Des Moines Art Center, or other larger facilities in Des Moines.

The Chinese Cultural Center aims to provide a place where people can understand Chinese culture by appreciating its art, enjoying its performance and studying its history and tradition. The facility also provides visitors with an opportunity of communicating, relaxing and entertaining by creating an artistic and cultural atmo-
sphere. Due to its multi-functional feature, the building can be used by different kinds of users, such as visitors including those from the East and the West, artists, scholars and students.

The Chinese Cultural Center is designed on the basis of original Chinese architectural principles evolved from Chinese culture and philosophy. Basic elements of the traditional structure are developed to incorporate with the new construction. Concepts of residential houses and gardens design are applied to the building to produce a viewable, touchable and livable "big house" and an intimate environment. The building itself is a demonstration of Chinese culture in architecture by understanding the context between history and the contemporary; between East and West.

Activity Settings

The following are the activity settings based on the users' activity requirements. It will include the room size, users' type and number, activities and requirement. The spaces serve to provide a cultural, educational and recreational facility.

Great Hall (Multi-function)

Size: 4,000 SF

Users: 100 persons, visitors, artists, actors/actresses, and scholars

Activities:

The idea of the Great Hall comes from the traditional Chinese residential buildings. In China, the main hall of a house is basically used for all kinds of living needs. All family daily activities, such as eating, studying, playing, sleeping, meeting guests and entertaining, take place in one big space which is called living room.
The Great Hall can be considered as a large "living room" to hold different kinds of activities for the public purpose. It creates a comfortable and intimate environment that makes people feel as if they were in a Chinese house, while they are appreciating the Chinese culture and art. Adequate open space produces a flexibility and efficiency for users and provides people with a convenience to communicate and socialize.

Exhibition: Display of art works
Performance: Chinese performing arts and fashion shows
Reception: Ceremonies and receptions
Lecture: Presentation of lectures and art works
Demonstration: Demonstration of arts with Chinese character, such as brush-painting, tai-ch'i and Chinese kong-fu

Requirement: Storage room serving the Great Hall is 600 SF. General overall illumination with the capability of effective stage lighting is required. The shape of the hall should be regular so it may easily be used for different purposes.

Educational Hall (Multi-function)

Size: 2,700 SF
Users: 80 persons, artists, scholars and students
Activities:
Classroom: Research, teaching and study of Chinese history and culture
Workshop: Creation of art works
Conference: meetings and communication

Requirement: The storage space is 500 SF. Shape of the space should be easily divided by flexible partitions. Overall illumination should be sufficient for reading
and writing.

Lobby

Size: 900 SF

Users: 40 persons, visitors

Activities: Introduction, meeting and relaxation.

Requirement: It is necessary to have a comfortable and intimate environment. A brief introduction and directory of the building is also required.

Restaurant

Size: 1,800 SF

Users: 50 persons, visitors and staff

Activities: Chinese cuisine, interaction and relaxation.

Requirement: A clean and intimate environment is required. A view to the exterior is preferred.

Kitchen

Size: 250 SF

Users: 3–5 persons, cooks and waiters/waitresses

Activities: Chinese cooking, dish washing, food preparation and storage.

Requirement: Kitchen requires accessibility to the eating area and proximity to the service entrance. The drainage and ventilation system should be effective to remove waste and smoke. Provision for typical materials and utensils for traditional Chinese cooking is required.
Reading Room

Size: 1,400 SF
Users: 50 persons, visitors, scholars and students
Activities: Research and concerning issues relating China
Requirement: A well lit and quiet environment is necessary.

Recreation/Practice Room

Size: 3,700 SF
Users: 50 persons, visitors, students, children and actors/actress
Activities: Parties, movies, games, such as ping-pong, Chinese chess, etc., dressing and practice.
Requirement: Variable lighting is required to accommodate different types of activity. Flexible partitions are also required for various activities.

Gallery/Temporary Exhibition

Size: 3,500 SF
Users: 60 persons, artists and visitors
Activities: Display of art works
Requirement: Direct sunlight and glaze reflection should be avoided and the unbroken space are needed. The storage space is 300 SF.

Office

Size: 900 SF
Users: 6-8 persons, manager and staff
Activities: Administration and maintenance
Requirement: It should be accessible to the public area.

Outdoor Recreation Storage
Size: 900 SF
Users: Visitors and staff
Activities: Storage of outdoor recreation facilities
Requirement: The temperature and humidity need to be appropriate for the stored materials. The capacity and accessibility of the space should be considered.

Mechanical Room
Size: 2,700 SF
Users: Mechanical engineers and staff
Activities: Fixing, checking and repairing
Requirement: The minimum space requirement should be 10% of the total building area, and the duct risers should be 6% of the individual buildings.

Restroom/Janitor
Size: 680 SF
Users: 15–20 persons, visitors and staff
Requirement: Besides regular toilets, unisex toilets are placed to provide convenience for handicapped people

Circulation
Size: 3,000 SF
Users: Visitors and staff
Requirement: Adequate space is needed to avoid the traffic interruption.

Parking

Size: 7,000 SF (40 cars)

Users: Visitors and staff

Requirement: It should provide accessibility and convenience from street to any entrances of building with minimizing traffic interruption.

The following is a summary of the settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Hall</td>
<td>4,000 SF</td>
</tr>
<tr>
<td>Educational Hall</td>
<td>2,700 SF</td>
</tr>
<tr>
<td>Lobby</td>
<td>900 SF</td>
</tr>
<tr>
<td>Restaurant</td>
<td>1,800 SF</td>
</tr>
<tr>
<td>Kitchen</td>
<td>250 SF</td>
</tr>
<tr>
<td>Reading Room</td>
<td>1,400 SF</td>
</tr>
<tr>
<td>Recreation/Practice Room</td>
<td>3,700 SF</td>
</tr>
<tr>
<td>Gallery/Temporary Exhibition</td>
<td>3,500 SF</td>
</tr>
<tr>
<td>Office</td>
<td>900 SF</td>
</tr>
<tr>
<td>Outdoor Recreation Storage</td>
<td>900 SF</td>
</tr>
<tr>
<td>Mechanical Room</td>
<td>2,700 SF</td>
</tr>
<tr>
<td>Restroom/Janitor</td>
<td>680 SF</td>
</tr>
<tr>
<td>Circulation</td>
<td>3,000 SF</td>
</tr>
<tr>
<td>Parking</td>
<td>7,000 SF</td>
</tr>
<tr>
<td>Total Area</td>
<td>33,400 SF</td>
</tr>
</tbody>
</table>

Site Considerations

As a cultural center, the preferred location of the building is to be in a city where it can be efficiently used by a considerable number of visitors. Thus, the city
of Des Moines which is the cultural and political center of Iowa state is considered as appropriate site for the Chinese Cultural Center (see Figure 3.1).

Cohesion of buildings and landscape is the basic concept evolved from the original Chinese philosophy. Based on this idea, the building should be located in a natural environment. As a public building, it should be accessible for visitors. Greenwood Park was selected as the site for the Chinese Cultural Center, it provides a remarkable natural landscape with the convenience of a location in the metropolitan area.

In terms of Chinese Feng Shui, the undulating landscape produces the breath or essential currents which bring the land life and prosperity, and flowing water brings good fortune and wealth. The hill and water can also generate a natural and intimate environment for the building.

Greenwood Park is also favorably considered due to its cultural atmosphere, as it is close to the Des Moines Art Center and the Des Moines Center of Science & Industry.

Greenwood Park is located in southwest of Des Moines with the total area of 500,000 square feet (see Figure 3.2). The natural hill and water pond is the basic topographic feature of the park. The large range of the contour is from EL.150 to EL.90. The dense vegetation covers most of the area with variety of trees, such as white oak, red oak and pine.

The weather of this area has the character of continental climate which marks seasonal contrast in both temperature and precipitation. The temperature changes greatly from summer to winter with annual average of 49.9 F. The dominant wind is the northwest and west directions.

Two rose gardens are located on the north-south axis and the amphitheater in
Figure 3.1: Overview of Des Moines Area
Figure 3.2: Location of Chinese Cultural Center at Greenwood Park in Des Moines
the southeast area by the street. The Des Moines Art Center stands on the highest
elevation of the park in north. It can be accessed from highway 235 and Grand
Avenue which is north to the park brings people from Des Moines downtown and
42nd street.

Respecting the existing landscape and the topography, the following four loca­
tions are evaluated (see Figure 3.3).

Location A: This is the area in the central part of the park and near the north
bank of the lake. In this location, building is south of the hill and north of the water,
thus is regarded as the most favorable site according to Feng Shui. It is, however,
too dominant to maintain the integrity and continuity of the public park and block
the view from the north side of the park to the lake. Besides, the steep topography
is difficult for setting the building.

Location B: This area is in the west side of the park. The contour is suitable for
the building. But the location is too close to the street and the area is limited for
building development.

Location C: It is in the east side of park and south to the amphitheater with the
relatively flat profile and adequate area for the building. The disadvantage of this
position is the marshy land and of proximity to the street.

Location D: The optimum site is west to the amphitheater and in the central­
east part of the park. The topography is relatively less steep and able to incorporate
the building with the natural gradient feature. In this location, the building is easily
accessed from the main street and far enough to avoid the traffic noise, as well as
beauty and serenity can be generated by the natural landscape surrounding. Al­
though the building is a little further from the main body of the water, the stream
Figure 3.3: Location Selections at Greenwood Park
can be extended north. The existing amphitheater may be relocated to the west side of the park.

**Design Concepts**

Application of Chinese Feng Shui to Site Selection and Building Orientation:

The site is selected with the hill in the back of the building and water in the front. This is preferable and auspicious according to Feng Shui. The undulating landscape with the dragon shape and flowing water endorses the building with “chi” and prosperity. Conforming to Feng Shui principles, the building is oriented in the north–south orientation to attain fortune and safety. The entrance faces south to enhance the natural sunlight and ventilation.

Implementation of Concepts of Yin/Yang:

This idea, which is developed from Confucianism and Taoism, represents the philosophy of contradiction and complement. This concept is demonstrated in the building with diversity and uniformity, symmetry and asymmetry, solid and void, spacious and narrow, order and disorder, irregularity and geometry, simplicity of the single building and richness of the building complex.

Harmony between Function and Form, Building and Landscape:

Based on multi-functional requirements, the building provides people with a cultural facility concerning aspects of efficiency, accessibility, convenience and intimate environment. Meanwhile, Chinese architectural principles and elements are employed to identify the specific character of the building and give it a unique quality.
Functional spaces are organized in several individual buildings respecting different requirements of activities. The organization provides a richness of the building complex in form. The existing landscape is utilized to create a beautiful surrounding for the building. And the building relates to the environment in dimension, scale, shape, color, proportion and rhythm. The integration between the building and landscape reflects the traditional Chinese thinking that nature is an inseparable entity of life.

Use of the Traditional Structural System and Standard Units:

The beam-column construction which is the main structural system in China is applied to the building. The column interval is used as the standard module. Repetition of columns forms the building, and repetition of buildings forms the larger scale building group. The uniformed modular units establish harmony and rhythm of the building composition.
CHAPTER 4. DESIGN PROPOSAL
Figure 4.1: Greenwood Park Existing Situation and Proposal of Chinese Cultural Center location
Figure 4.2: Site Plan
Figure 4.3: First Floor Plan

1. Lobby  2. Storage  3. Men's Toilet
4. Women's Toilet  5. Unisex Toilet
6. Janitor Room  7. Recreation/Practice Room
8. Men's Toilet  9. Women's Toilet
10. Gallery  11. Temporary Exhibition
15. Unisex Toilet  16. Office
SECOND FLOOR PLAN

Figure 4.4: Second Floor Plan

17. Upper Level Lobby  18. Reading Room
19. Men's Toilet  20. Women's Toilet
23. Coat Room  24. Open Pavilion
Figure 4.5: Basement Plan

27. Party/Reception Room
28. Men's Toilet  29. Women's Toilet
30. Unisex Toilet  31. Mechanical Room
32. Storage
Figure 4.6: South Elevation
Figure 4.8: North Elevation
Figure 4.9: West Elevation
Figure 4.11: B - B Section
SPACE ANALYSIS

Figure 4.12: Space Analysis
CIRCULATION ANALYSIS

Figure 4.13: Circulation Analysis
Figure 4.14: Perspective View of the Building
Figure 4.15: Model of the Building
CHAPTER 5. DESIGN INTERPRETATION AND DISCUSSION

This chapter illustrates the development of the building design regarding aspects of site, program, form, and technique. The analysis focuses on how the principles of Chinese traditional architecture have been reflected and applied to the building design of this project.

Site Utilization

The Chinese Cultural Center is located in the southeast part of Greenwood Park. By surveying and analyzing the condition of the topography and transportation, this area is identified as the optimal location for the building.

Since ancient times, Feng Shui has been a significant method used to select building locations and directions in terms of fortune and misfortune, prosperity and poverty. The following diagrams are the Feng Shui guidelines used in the practice (see Figure 5.1, Figure 5.2, Figure 5.3).

With respect to the Feng Shui principle, the building is situated in north-south direction with the primary elevation facing south. This is usually considered as the indication of fortune and safety. Practically, the south face can get the maximum sunlight and natural heat.

Responding to the natural features of the site, the building is located to face the
water and present its back to the hill. According to Feng Shui, flowing water can bring “chi” and fortune, and the hill can defend the northward wind in winter. In the design, the lake is extended toward north to form a pond to the east side of the building to enrich the building view. The dragon shape of the natural topography in the east is also a lucky sign for the building.

The parking area is located east to the building and west to the street which brings the major transportation from highway 235 and Des Moines downtown. It is also accessible from the Des Moines Art Center and the Des Moines Center of Science & Industry. Because of the need of space for the parking area, the existing amphitheater is relocated to the southwest of the park (see Figure 5.4).

There are a large number of significant trees in the park, the building design is developed to protect them as much as possible. Trees in the construction area are relocated.

**Function and Space Analysis**

The Chinese Cultural Center is a multi-functional building. The whole complex is U-shaped and includes five individual halls and pavilions which are connected to each other by galleries and a semi-open courtyard (see Figure 5.5).

The main entrance is in the southeast where it is the beginning of the building complex and the nearest point from the parking area. In regard to the cold weather in winter, vestibules are designed at all the visitor entrances. The reception lobby is two-stories in height and the indoor staircase gives access to the second level balcony. This is the place to welcome the visitors and provide them with a brief introduction and orientation of the facility.
GOOD

House facing south

U-shape pattern with a high back facing south

Road to the east of the house

Staircase by sides of the house

Figure 5.1: Feng Shui Guidelines (a)
BAD

House at a T-junction

High boundary walls

River or stream cutting across the site

Staircase facing the main door

Figure 5.2: Feng Shui Guidelines (b)
The principal components in good Feng Shui landscape are:

Generally, meandering and undulating features are preferred so as to reduce the amount of bad "chi" in the site and also as a means of containing good "chi".

Figure 5.3: Feng Shui Guidelines (c)
Figure 5.4: Circulation at Greenwood Park
Figure 5.5: Functional Organization of Building Complex
The restaurant is under the lobby and extends to the north about 50 feet. It consists of a public eating area and a party/reception room. The kitchen is located between the two to serve both efficiently. The whole area of the eating space is next to the pond to provide people with an opportunity to enjoy the view while they dine. The party room is enclosed by movable partitions. When a larger party is held, the corridor may be used as an extension. The roof of the party room is a terrace for people viewing the pond from the upper level.

The service entrance is in the northeast of the building. This is reached from the parking area. Storage is next to the entrance to provide the most convenience for loading and unloading freight. The reading room is above the storage and also has a view of the water.

The Great Hall is next to the reading room and in the north back of the complex. It is the focus of the building and holds the major activities which include exhibition, performance, reception, presentation and demonstration. The large space provides people with a flexible and comfortable environment to communicate and appreciate Chinese culture and art. The original idea of the Great Hall is developed from the living space of the Chinese residential house where people can meet together and hold any kind of activities.

The Great Hall has two-stories which makes it the highest building in the complex. A balcony surrounds inside the hall to provide a higher viewpoint to enjoy both indoor activities and outdoor scenes. This balcony design derived from the 1920s Chinese theater. As the stage usually had a higher space than the audience area, the balcony was built to get more viewing space and different viewing effects (see Figure 5.6).
The base of the Great Hall is designed for recreation, practice and dressing. The space is flexibly divided by movable partitions. Usually, it can be used as a recreation room. When a performance is held, part of the space may be enclosed for preparation, such as practice and dressing.

Another multi-functional space, located in the west, is designed as the Educational Hall. It can be used as a classroom, workshop or conference room. This is the place to provide students, professors and scholars the opportunity to teach and learn, work and practice, research and communicate. The lower level is the temporary
exhibition area. Storage is provided in this area.

The gallery is in the northwest of the facility. The roof of the gallery is a terrace where it connects the Great Hall and the Educational Hall in the second level. A continuous wall is located in the gallery to provide adequate surface for hanging exhibits and avoid direct sunlight and glaze reflection. At the same time, skylights provide natural light and integrate with artificial light for the gallery (see Figure 5.7). Skylights are pyramidal shaped to incorporate with the pavilion roofs.

![Figure 5.7: Gallery Skylight](image)

The office area is at the end of the building complex. It is connected with the public area but with privacy from the public. The office area is designed as a large space in order to provide users with the flexibility to arrange it according their needs.

The upper level of the office is the open pavilion which is accessible from the second level terrace. The built-in seats around the pavilion are for people to rest, communicate and enjoy both the courtyard view and natural landscape.

There is a storage under the office which is open to the outside to store the outdoor equipment, such as yachts, tractors. The mechanical room under the Educational Hall is connected to the storage. By meeting the requirement, the size of this area is 10% of the total area. Besides, there is 6% duct riser space in each individual
buildings.

Respecting special requirements of the handicapped people, unisex toilets are designed besides the regular toilets. It provides companions with convenience of help and assistance.

There are two elevators to provide vertical transportation which separately located in northeast and southwest of the building. One serves for the Great Hall, reading room and restaurant. Another one serves for the Educational Hall, office and mechanical room. Besides, staircases are separately set in two halls and the lobby, so each building can have their own vertical circulation. There is a back stairway for the actors/actress to access from the practice room to the Great Hall. Horizontal circulation depends on passages and the terrace. Handicapped access has been considered in every building.

The parking area is to the east of the building and west of the street. The shape of the parking area is designed in an irregular belt to blend with the natural topography. Since the street level is 24 feet higher than the parking area in north, it is designed in loop pattern with the opening in south. At the entrance, trees and grass are planted to enrich the street view of the building. Avoiding the tiring feeling of the length, the parking area is divided into several parts by the groups of plant which also provide the beauty for the building environment. According to the Feng Shui guide, the main path from the parking area to the building entrance is curved to prevent devil from getting into the building. There is also a pedestrian path next to the pond. People can enjoy the east view of the building as they walk from the parking area to the entrance.
Formal Organization and Landscape Design

Based on the principle of Chinese architecture, the design consists of an assembly of parts rather than a single volume. It includes five individual halls/pavilions and continuous galleries. Within this complex, there are contrasts of solid and void, symmetry and asymmetry, the great and the small, the high and the low.

The concept of the spatial series is generated from the principle of Chinese city construction (palaces, residential dwellings). It is established from the philosophy of Confucianism which emphasizes rational order and rigid hierarchy. Applied to the architectural space, the spatial sequence is usually from the entrance hall (or gate way) to the gallery (or walk path), then to the main hall, finally to the exit. In other words, the sequence is from the semi–large (leading in) to the small (preparing for large), then surprisingly to the main space (climax), eventually back to the semi–large (end). This method can also be found in the concept of yin/yang that is “In order to expand a thing, one should surely contract it first”. Following the above idea, the Great Hall is designed in the center of the spatial series which is south to the semi–open courtyard and back to the north.

Another influence on the spatial organization is developed from the principle of Chinese garden construction. This is based on Taoist philosophy. It stresses free layout, irregular form and natural feeling in design. Since the building is located in a natural environment, the complex is grouped in asymmetry and irregularity for more flexibility in space and harmony with nature (see Figure 5.8).

In elevation, the building is divided into three parts – base, body and roof (see Figure 5.9). Due to the height difference of the topography, the first floor is basically designed as the base for the halls and pavilions. This provides all weather connection
Figure 5.8: Spatial Series and Organization
between the parts. The building body shows the appearance of the beam-column structure which will be discussed in detail in the next section. Overhanging gabled roofs are used for halls and pyramidal roofs are used for pavilions.

The courtyard is normally an element in Chinese architecture. In this project, three sides of the courtyard are enclosed by buildings and one side is open to the south. Respecting the natural landscape, it steps up to the base of the building. Flower beds are placed on the terrace. The second level of the building can be reached from the courtyard. Meanwhile, the elevation of the building provides a
background for the courtyard. The courtyard provides a transition between inside and outside, construction and nature.

The natural stream in the park is extended to the north. It flows in the front of the courtyard, crosses the entrance path, and forms a pond to the east of the building. It enhances view both from the street and the park. It also provides for containment of precipitation. Trees are planted along the parking area to screen the parking area from the street (see Figure 5.10). Rhythm and harmony have been created by the integration of the building, courtyard and landscape.

![Figure 5.10: Analysis of Street Visual Effect](image)

**Structure and Materials**

The beam-column structure is used in the building construction. This is the basic structural system in Chinese traditional architecture. The building is divided into modules based on the intervals of the column. By analyzing and summarizing the layout of the Chinese traditional halls, the standard unit is established at 15 feet by 15 feet. By various combinations of the basic unit, spaces can be formed in different shapes and maintain consistency with the whole building complex. Unified
modules also provide convenience and efficiency for the beam-column construction.

In the beam-column structure, columns and beams act as the frame to carry the building loads and walls which carry no weight act as screens to enclose the building. As the base for the halls and pavilions, the columns of the first floor are enclosed by concrete walls. The wall is surfaced with white stucco. This is the most popular color of residential buildings in Southern China. Square windows which are simplified from the gallery openings of Chinese garden are the basic feature and form the unity and rhythm on the wall.

For the body of the building, the appearance of halls and pavilions honestly express the beam-column construction with columns exposed. The space between columns is filled out with lattice windows and openings which are the typical characters in Chinese traditional architecture. The color of the frame is adjusted to match the original wood feature. The top part of the column is enlarged into a "seat" to assist column supporting the beam and eave. This element is developed from tou-kong which is the fundamental part in the traditional timber construction. It has basically followed the shape and proportion of tou-kong but simplified from several pieces into one piece (see Figure 5.11).

The overhanging gabled roof is formed by overlapped beams which are gradually recessed from base to top to obtain the smooth slope. Greenish grey tiles are used in the roof. It attains the relationship with the surrounding plants in summer and bring people with a feeling of spring, bright and peace in winter. The overhanging roof can also enrich the profile of the building and shield the structure from rain and summer sunlight but let the low rays of the winter sun strike the south windows and walls.
The balustrades are designed in Chinese style which are simplified from the traditional patterns. They are used to surround the terraces and balconies, and function as the decoration of the building.
CHAPTER 6. REFLECTION

This chapter is a review of the study. It is a reflection of how Chinese architectural tradition can be implemented into the design regarding building site, type, organization, structure and architectural philosophies. The entire design process displays a consideration and balance between traditional and conventional design. The completion of the program is the result of study on history, culture, tradition and architecture.

Through the author's undergraduate study in China, the knowledge of Chinese traditional architecture, principles, methods, and structures was developed. Also, the design process of conventional architecture and modern western architecture was studied. The study, however, hardly combined the two issues together to develop a contemporary architecture by implementing the traditional Chinese architectural principles. In addition, some significant philosophies and principles, Feng Shui and yin/yang, thought as superstition and non-scientific ideas, were not studied in China. Even Confucianism and Taoism were criticized, but are now beginning to be recognized and instructed.

This program provides the author an opportunity to utilize Chinese tradition and culture to develop a contemporary building in the western environment. It also allows the author to enrich the education obtained in China with respect to Chinese
tradition and architectural form.

The study of this program is a summary and development of previous study. It enhances the ability of working on the entire process of an architectural design, from information collection regarding the site, background study including culture, tradition and architectural examples, to the organization of the design program and the completion of the research.

Reviewing the design process, the selection of location was the first problem. Since the intention of the program was to incorporate Chinese tradition into the design, Feng Shui, which was the essential technique of selecting a building site in China, was considered in regard to orientation and environment. Greenwood Park was selected as a building site for the natural features of hill and water which are regarded as “good” in Feng Shui. By studying and comparing different conditions at the park, the current location was selected because of its moderate slope and easy access of circulation. However, the existing cross topography, which sloped up from southeast to northwest, produced a difficulty in establishing the building. The land would have had to have been transformed to a level foundation, which would have destroyed too much existing land form. In respect to the existing contour, one option was to build an underground parking area but this option failed because of its expensive cost. Another option was to raise galleries to the second level and have the first level open. It was unsuccessful since it blocked the view of the main building.

After several attempts, certain building design decisions were made based on Feng Shui principles and the existing land form. The building complex was set in north–south orientation and the main facades of the building faced south. The first floor was built as the solid base of five individual buildings. Formally, it acted as one
of three parts of the building elevation. The highest and most important building was constructed in north back to dominate the higher elevation and obtain the best view from the low front area. The semi-courtyard was terraced to provide connection between the lower topography and higher buildings. Also, the courtyard was an integral part in Chinese architecture.

In functionalist designs, building types are developed from functional analysis. Spaces are identified and formed based on functional requirements. For instance, a theater may be fan-shaped for consideration of the optimal visual effects, and a gymnasium can be designed in an oval-shape since the audience usually surrounds the playing field. Functional needs define the building type and spatial form.

The Chinese Cultural Center is to be a multi-functional building complex. It holds different activities consisting of exhibitions, performances, lectures, demonstrations, studies, conferences, recreations and administration. Based on the above idea, different building types were combined into one complex to satisfy the different functional requirement. Although the intent was to implement the Chinese traditional methods, it was difficult initially to work in this model because of the extensive training have had in the functional method of design. After some “false” starts, it was found that generating a consistent form and style by simple spatial combination was not possible, let alone creating a building complex influenced by Chinese tradition. It seemed the functionalist design process, in which functions determine forms and spaces, could not work in this specific traditional design program.

Through thousands of years of evolution, certain building types have been established and developed in China. Basic types are halls, pavilions and galleries. Taking advantage of these historical sources, another approach which differed from the func-
tionalist design was attempted. It was the way to set up the building types first, then fit the conventional functions into the traditional spatial models. Since basic building types – halls and pavilions are rectangular or square shaped, it provides a possibility and flexibility to be filled with different kinds of activities.

From this program, it can be demonstrated that not all the design projects follow the functionalist process which is from function to space, to form. In some specific design, the opposite method, which is from type to space, then to function, may work better.

Another consideration was the organization of the building complex. In conventional methods, the building is designed in one volume and variation of the spaces are presented under one roof. The Chinese way, however, is to break one into pieces. The individual characters of halls and pavilions determined that the building complex could not be constructed in one volume. Instead, it was organized in clustered layout and individual buildings were connected by galleries. Variation of the spatial organization also created an attractive and delicate building outline in the natural environment. The whole combination not only generated a rhythm between buildings and landscape, but also brought harmony and communication between man-made and nature.

With the adoption of traditional building types, certain architectural elements were involved in the design. Gable and pyramidal roofs, which formed the integral parts of halls and pavilions, were selected for the design. In elevation, the three architectural divisions, which represented the traditional building appearance, were also included in the design. The sequence of the design project from type to layout to style can be illustrated from the above discussion.
Building structure and material were next to be considered. Conventional structure could be one of the options since it would provide an advanced technology and a convenience of prefabrication. On the other hand, traditional structure could offer a better match with the traditional building types but would provide less convenience and efficiency. Being a traditional design, more attention was paid to the architectural character and the consistency of the style. The latter method was implemented by simplifying the traditional beam-column structure. Chinese architecture could not create its own style and character without its unique structural system. Wood was selected as the frame material for its advantages in its use for Chinese traditional structure. Modular units called “jian” were used to form the spaces of halls and pavilions. The appearance of the building honestly presented the structure, and the structure created the personality of the building.

In search of the formal and structural motif, many examples of Chinese traditional buildings were studied and analyzed. It served as an important source and reference for the research of this program. The Forbidden City in Beijing was studied for its architectural spatial series. Suchou gardens and Beijing courtyard residential houses were the references of the spatial organization. Fo–guang Temple at Wutai Mountain in Shanxi was studied for its structural system and column layout. Confucius Temple in Qufu, Shandong was the reference for its three-part elevation and window patterns.

In this traditional design, there were certain Chinese philosophies, mentioned before as Confucianism, Taoism, yin/yang, and Feng Shui principle, that have been followed and applied. The contradictory and complementary relationship found in some of the above philosophies was expressed in the symmetrical single building and
the asymmetrical building complex, the spacious/high halls and the narrow/low galleries, the solid/bright wall and the void/dark timber frame. The buildings’ contrasts in size, shape, color and proportion created the flexibility and the efficiency in function, as well as the richness and the rhythm in aesthetics. The philosophical thoughts founded the critical basis and guidance for the architectural application. Architecture is one of the reflections of the culture, and the consistence between culture and architecture could be obviously found in Chinese construction.

Even though the building contains certain elements from Chinese tradition, it by no means suggests an appearance of a Chinatown. It shows a high coherence with the modern time and western environment by implementing the essence and the principles of Chinese tradition. The design is not a mere copy of the old style, instead, it embodies the spirit and image of the tradition and culture.
BIBLIOGRAPHY


APPENDIX  CHRONOLOGY OF CHINESE HISTORY

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