“Spatial Procession and Linkage through Light”

Light & Shadow

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Introduction

Building is one of mankind’s basic needs. We live, study and work within architectural creations. Architecture is an environment, an etiquette and a representation of a culture. By studying the architecture of different areas it is possible to learn something that we never knew before. Western architecture and Eastern architecture exemplify many differences in culture; different expression in buildings can in many ways reflect the inherent differences in cultural values. In the following text I aim to investigate the Eastern World, and examine how the careful manipulation of light can shape how we use and experience architecture.
Transparency

Transparency is always an important factor in architecture. It can communicate between the inner and outer space; it allows people to experience areas of the building before entering; it is where light comes in to the building, a fundamental factor in architecture. To control the amount of light, the shape of light and the colour of light is a key concern to us as architects.

As Louis I. Kahn said ‘structure is the maker of light’. The development of technology in construction is strongly related to our light control. The gap between structural members creates the openness of our buildings, it is the point where we allow light to enter. We then use different materials to fill these voids, all these materials have various transparencies, without this our building could not become a shelter for us to inhabit. Using translucent material in building has great significance in architecture. It gives a certain texture to the building. To use various types of materials to clad the building also becomes an opportunity for us to adjust the light of the inner space.

The idea of using glass bricks, frosted glass, u-shape glass and also the paper window of the East are prime examples of the beauty of translucence. They reject the external views but allow light whilst diffusing it. The figurative external world turns into shapeless light appearing on the surface of translucent material. In designing, the need arises for a large opening that does not let much light in, translucence is useful.

‘The hidden fascinates’ and ‘The difficulty increases desire’ are two phrases that I find very interesting. Why do women in Persia hide their beautiful faces behind a veil? Does it not make their lover feel they are even more beautiful? Like in love, when both people understand each other so well, life is in danger of becoming overly predictable. Constant exploration is in our nature; to keep some distance, yet preserve a sense of mystery wonder to maintain passion.

The translucency of a building’s surface becomes a barrier between two sides; the feeling for the viewer from outside is different from the actual sense of space when the viewer gets inside. It creates a complex relationship and increases the distance between the two worlds. This relationship in contemporary architecture is being subtly interpreted.

1 Kaen, Lujun Wu, and Louis I. Kahn, Guang Yu Ying Lu Kang De Jian Zhu She Ji Si Kao (Louis I. Kahn Conversations with Students), (Taipei Shi Yuan Dian Chu Ban, 2010), 7.
Openings

Louis I. Kahn said that, natural light gives character and life to a space, that is illumination by the natural light of the environment. Only when we give buildings light then spaces become real. To allow the light coming in, the window plays an important role and for different types of space we use the window differently. I think the three main types of organizations are centralized, linear, clustered and grid organized. For linear organization, the lighting of architectural space depends on the depth. If the space does not have great depth a side window will solve the problem, if the space is deep, skylights will become necessary. For centralized organization, when the central space cannot get enough natural light from the side windows an atrium is used. Light wells or courtyards are a common way to get light into these central spaces and because of their function and unique form they often become the center of architectural importance. For clustered organization the spaces are combined by small scale space, large areas of a building's skin can allow interior space take light from the side or above. Compared to other organizations it is much easier to get good natural light. Within grid organization, artificial light is often required as the spaces are usually very deep.

Louis I. Kahn said that wall did well for man. It protects us by its strength and thickness, if we make a hole in it, we had better make it nice and precise to respect the wall. The orientation of the opening for spatial creation is essential. Light is not just a resource but also a force. We use different orientations of openings in space to let people experience the various quality of light at different times of day and year. The dimensions of the opening and its relative scale affect not only the physical light and energy but also a connection to the environment. This natural feeling is needed in spaces, it provides comfort when inhabiting and expresses the form of space.

These holes can function as doors and windows. Doors provide access and security. Windows provide ventilation, lighting, soundproofing and security. They can also decorate the facade of a building to convey the designer’s philosophy. With the development of technology, the form and structure of doors and windows has dramatically changed, many original elements are simplified. The construction of buildings has greatly affected the appearance of doors and windows, especially windows. Previously most of our buildings were brick structures, the wall acting as protection compiled of loading elements. This limited the size of openings on the wall, and created difficulty for the architects to design windows. Within reinforced concrete structures we make use of beams and columns.

Walls can provide the functions of protection and separate areas, therefore we can design much larger openings on our facades, such as long horizontal windows like those of the iconic Villa Savoye. Now, there are a lot of buildings using steel structure, the form of windows can have more flexibility, glass curtain walls are often used, and through the development of the glass curtain wall, we use less and less framing material. This beautifully demonstrates the performance of technology. Excellent structural design and building materials combined with advanced energy saving technology are all benefits from the development of building structure.

The change of culture also has an effect on our windows. Along with the development of our social and living standards and people’s ideological attitudes there is a constant change. The requirement of indoor space is constantly changing too. Some of the original confined spaces are not suitable for most of the modern mind, people are increasingly seeking openness and transparency, Le Corbusier’s ribbon window is a prime example of a large opening fusing the private and the public. Perret stated that, “if the windows become bigger, there will be no difference between inside and outside.” We may feel lonely inside, so we bring our mind or friend and enjoy it. Too much light will destroy the sense of quiet and safety. We now create a lot of large glass panels, used both indoor and outdoor to give transparency to space. Public
buildings such as restaurants contain entire front facades covered by glass curtain walls. These create a transparent interface to communicate the interior and exterior space, the public can feel part of the restaurant prior to entering. This aids the business. Still however, some architectural spaces such as residential and office spaces require some form of privacy. Windows are retained in the traditional form. As construction continues to increase its volume, the windows are increased with it. To control the amount of window coverage becomes an important factor when we design. For residential and office building, windows and doors have their regularity, their functionality greater than their decorative qualities. For entertainment buildings, windows and doors can be exaggerated and jumping. The decorative elements are especially important. For shops and eateries, windows and doors pay more attention to create an open transparent facade to improve lines of communication between the two sides. In financial buildings, the sense of protection becomes much more important. The scale of windows and doors need to be carefully judged, it should send out the information that it is a safe place to save money, and portray reliability. Government offices are generally symmetric, to give the impression of stable and working within rules, the windows and doors often look regular8.

As different types of buildings need different types of windows, the different light affects spaces interestingly and this I find exciting. People use the natural element of sunlight to give space life, light bounces around us, its projection, reflection, diffusion, blur and focus are all visual. They create the expression of space and give character and mood to it so that the space can affect our emotions.

8 Bian, Yin. Jian Zhu Wai Li Mian She Ji (Design of Architecture Facade), 196.
Architecture of the East

There are numerous differences between Eastern and Western architecture. Japan is a great example of Eastern architecture, a lot is learned from Chinese culture, and there are many similarities between the two types of architecture. Compared to the grand and magnificent buildings in China, Japanese architecture is more succinct and elegant. They display a better beauty of structure, the text of material and colour. In addition Japanese architects seem more creative on the reproduction of natural beauty with architectural ideas and skills. Japan is a rainy country, so its natural condition makes for a big difference between many western countries, Japanese architecture often has a huge roof to shelter the building and offers an outdoor corridor. In the west, most building roofs are close to the edge of the facade and the façades are often parallel with the street, people experience the front of the building in a regular and uniform way. The Japanese architecture usually considers the facade with the north south orientation⁹. People from the street can experience more than one facade when they pass, as the facade is the first impression of a building, it gives more depth to the architecture and connects the natural with a 3D way to give more natural life to the area.

How to make a nice facade with suitable function is always important for architects. Structure plays a very important role in this. The traditional Japanese buildings use timber structure but due to the relationship between the earthquakes and fire, the buildings keep increasing in volume. The evolution of structure is vital. Concrete frame and steel frame structures have given huge opportunity in architecture to deal with the facade, the opening can be much more freely. Curtain walls can be placed either inside or outside of the structural frame to give more depth to the facade. Due to the development of structure, our design is more free. How to design the architecture by using the new structure and technology but still maintaining the eastern culture becomes something very important, we do not want to see all modern buildings look the same, the culture of a place risks being lost as buildings are the marks of history. Sensibly violating the objective laws¹⁰ is the rule that I think can design a beautiful facade with contrast.

In Praise of shadows by Junichiro Tanizaki is a very important book which describes the beauty of darkness and the difference in understanding between east and west. With the development of technology, many new developments appear that replace the old ones. Some of them are good, for example the light bulb; it has already become a basic need. Some of them are o.k. such as fans, its sound and its shape does not fit in with Eastern culture, but if the condition really needs it, it is acceptable¹¹. To control the use of new technology is an important thing to consider because we want our living space to be as close to nature as possible. Junichiro Tanizaki describes the details of toilets in the background of Eastern culture. The toilet used to be a separate room away from the main body of the house. When you have to go to toilet, you need to go to outside and walk along the exterior corridor, pass the natural element in the courtyard, experience the conditions of the weather, and then you end up in a dark toilet, the darkness of the toilet is very important, and the author thinks it is necessary to have darkness as one goes to the toilet - it is a very private thing to do - simultaneously listening to the wind and rain, enjoying the coldness. Junichiro Tanizaki feels that is the unsurpassed elegance of Eastern culture¹².

The Azuma’s house is a good example of a building that is close to nature and set in Eastern culture. It is designed by Tadao Ando. It is a small rectangular building fitting into the gap between two old buildings. It is designed for people to live in, and it brings about some interesting questions. Firstly the house is surrounded by four concrete walls, there is no opening other than the entrance. Secondly the interior, exterior, wall and ceiling are all a concrete surface. Thirdly is that the small space is broken into three parts, and no ceiling is given in the middle to create an open atrium. The ground floor is living space, kitchen and toilet, all the spaces that require the use of water, the first floor contains the bedrooms for couple and kids, all the connections are cut by the mid


atrium\(^{13}\). I think these three elements can describe Eastern culture in Ando’s mind. In Ando’s childhood, he lived in a two-story timber house, and because he lived there for many years, he thinks that a house should be narrow and dark; hot in summer and cold in winter, and he accepted it naturally. He feels that even he is poor, but he can still feel the joy from the change of four seasons. When Ando traveled to the USA he saw another way of living. No one seemed worried about money and he noticed the difference of resources and living habits between Japan and the United States. We only have limited land, and we should find our own way for living\(^{14}\). Relate these back to the Azuma’s houses, it seems this is the first response that Ando gives for the way he thinks is suitable for our eastern culture. The concreteness of the Azuma’s house shows us the plainness of our culture. The open atrium lets the rain come in to our space. This brings us closer to the natural, it may not be ideal for example when it is rainy. If at this time you must use the toilet you still have to walk past the rain. It gives the chance to the people who lives in Azuma’s house to really enjoy the natural condition, enjoy the weather changing in its four seasons. It is also a link back to Tanizaki Junichiro’s point of unsurpassed elegance.


The beauty of dimness and oldness is another point that Junichiro Tanizaki described in the book, an example of oldness is the Chinese fan, it is made of bamboo, after many years, the sweat comes of the hand gives a natural decoration to the fan. It gives value to the fan, which a new item may never possess. Darkness is one of the key factors of our culture. Imagine yourself eating dinner with candles, the shining rice sits in a black container, green tea raises its steam from the dark coloured cup. You can only know the taste when you come closer to smell and drink it. In the temple, monks wear clothes with a golden edge, and sit in the middle of the building. The gold shining in the dark space, shows us a mysterious beauty. I think the beauty in darkness is not only understood by those of the East. Mark Rothko finds the beauty in darkness. Most of his paintings contain only sample color blocks and when these color blocks meet, their edges are unclear, they mix together with blurs upon touching. And in the later stage of his work, the colour he choses becomes darker and darker. In his exhibition, he tells the staff to turn down the lights as much as possible, to let you just be able to see his painting. This made me consider that the mysterious beauty in darkness is not only accepted in the East.

The difference in architecture between east and west does not happen because eastern people like darkness, it is mainly because the difference of our structure. In the west, people are used to buildings of stone. We can see many of these buildings now, they have been built for hundreds of years with super quality, but in the east, we try to do things fast, and we keep destroying the old to build something new. Stone is not a good building material for us - we used a lot of timber structure in buildings, and we use paper to cover the gap between the frames to create windows. All these factors mean our buildings need to give more consideration to the potential damage from rain water, so we build huge roofs to prevent rain coming from the side, and because of the huge roof, it makes our interior space darker. Our ancestors knew that brightness was important. A long time ago when there were no light bulbs, sunlight meant safety - it prevented us from attack. But due to structural reasons we can only build it in this way and our ancestors lived in these types of dark spaces not by choice. Unconsciously, we discovered the beauty in darkness, then we pushed it further and created darkness on purpose. Paper diffused the light and weakened the light changes. When you are in the space, it makes us forget about time. In the summer time insects will not come in because of the light, so what stops us creating spaces with these types of qualities?

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Suzhou Museum is designed by “Bei Yu Ming”. It is a building that tries to bring back the historical features of the area. It contains many form characteristics of eastern building, the simple white walls show the plan, the roof, the circle opening in to the courtyard, intertwining the building with a man-made landscape, soft and quite interior spaces, they are all characteristics of our tradition. The layout of the master plan in particular is of eastern origin, the manner in which the bridge and water are included, the sense of looking at each other from the two sides of the water. I think there is also a way to improve this project. For example, in some of his roof design, he chooses the glass as the material of the roof, it seems he wants to use modern elements in his design, yet it violates the initial concept of the Chinese roof. With the improvement of technology we should care not only about how to create the form but also look at the essence of our creations, then we can vastly improve our design.

The China Academy of Fine Arts in Xiangshan Campus, designed by Wang Shu. I find this project successfully represents the culture of the east. He uses the materials brick, tile, leaves, bamboo and wood which all contain natural qualities. He considers that rain is extremely important. Imagine students looking out from the window, watching the rain dripping from the eaves, it is such a romantic scene. All the buildings are U-shaped, at the core of which Wang Shu plants trees. He also imagines that when the trees grow taller students can study within the shadow created by the leaves. It is beautiful example of connecting the landscape with the building and also expressing the architect’s understanding of our culture not formally, but in its essence.
Studies of Light & Space

Here is the concept model that I made from my studies. This model is made of a simple timber frame, and most walls are made of white paper, and only one exterior wall is made by white card. The plan of this model is a simple rectangle, on the bottom left is the entrance, on the top right is the double height space. The idea for using white paper is aimed at diffusing light to show the idea of plainness in eastern culture and make a mysterious connection between outside and inside. Just imagine when you walk on the outside, passing the solid wall which is made of white card, then you reach the entrance. The faint view of people walking on stairs that you can see from the outside gives an idea of movement in this building. When you walk into the building, the interior space is completely different than what you feel from the outside, the idea is that when you come closer to this building, you get more from it. Finally you end up in a space with no direct sun light. It makes you forget about time, and really be able to enjoy the space.

This model is built of timber strips and due to that the facade of this model gets the character of the timber structure, the light coming from the gaps between timber strips. At the thickness of the timber wall, the light forms a spot light, light bounces around the edge of the opening, gives a sense of the holy and unpredictable. At the end of this model, the facade is inclined outwards, trying to create the physical character of the huge roof giving power to the building itself and bringing back the feeling of eastern culture.
This is a model I made for Utopian studies, it is a public building in the fictional town of Mattapoisett. There is a brief description about this building in the book, "Woman on the Edge of Time". It is a Grange Hall and Community Hall. It shows to public the story and idea of how the town works. The first part of my building is the Grange Hall, it is described as a three-hundred year old wooden building. So I can imagine this part of the building is built first, and the form is regular due to the technology of the period. There is also an octagonal tower combined with it. The idea of a tower seems too strong to me, it shows a great force of the government, I do not like it to become too obvious in its appearance. So then I decided to move the tower back, when people are looking from the front of the building the tower will not look too imposing. By doing these things it also creates a nice courtyard in the middle of the building. This combination is typical of eastern building, trying to locate rooms and create courtyards. The community hall is the last part of my building. It is described as a loaf of bread landed on a hill, so I can imagine it is a modern building combined with high technology. It is the last part of the building attached to the government building. And from the description of a loaf of bread, I designed the roof of the community hall like slices of breads with the quality of timber that pulls in the relationship with the environment.
This is a study model of a room - it is a rectangular space with one inclined plane. When you walk into this space, you have to make a turn before you can really get in to the main space and the light in this space is created in multiple ways. Generally they are all soft and lead you through the space. The timber frame captures the landscape as a picture, creating a nice screen for the people who are using the space, which is an important characteristic of traditional building.
Feng Shui

In Chinese architecture, feng shui is always a very important topic. Feng shui is about how to connect the human with nature, using the surrounding environment to create a healthy place to live. Feng means wind, and shui means water, how to use these two elements is the key factor to create a healthy shelter for people to live.

Feng shui has its scientific side as well as its superstitious side. Some people emphasize the value and position of feng shui too much, ignore the extremely harmful superstitious side. As an architecture student, the scientific is the part that I am interested in.

We usually see a feng shui drawing with a small house in the middle, a tall mountain behind and a river in front of it. The mountain behind blocks the wind from back, the river gives warm air and a fresh environment. In my understanding I divide feng shui into two parts, visual and health condition. For the visual part, the key is constantly changing the view while you walk through the building. The combination of rooms can always give you surprise when you experience the space, and use the natural element to show the combination of building with the landscape. By doing that, I use the methods of framing the view and releasing after press. To my knowledge framing the view is not simply to open a window on a wall, we need more of a feeling of life. I believe if the building can change with the view outside while you moving inside the building it will further develop the idea of a framed view. The method of "release after press" is very straightforward, lightness after darkness, openness after narrowness.

In the above room study model I used above two methods. I made an openside in the space then created a frame behind the opening but with a gap. When you walk in the corridor of the first floor, you move from a narrow dark space to an open light space, and at the same time, the view you get is not simply the outside landscape. You can experience the change in size of the window frame so that the whole building and landscape combine and change together to achieve the concept of connecting human with natural in feng shui.

For the health condition, using the wind and controlling the temperature is what feng shui entails. In the guide of learning feng shui, there are many restrictions about how to localize the building, for example you want to place your building beside a curved and slow moving water source, you want to place your building beside a slow traffic road, you do not want to place your building in a gap between two other buildings, you do not want to place your building facing an angle or arrow of the road. For the interior space, the position of rooms are also follow specific guidelines. For example, the door of a bedroom should not face a bathroom or kitchen, the key room should be located in the middle of the house, beds should not placed under the main structural beam. All these restrictions actually stand by scientific reasons. For the location of a building, it is considered best avoid the fast wind and dust from outside. The placement of a room is decided regarding how to maintain the temperature of the room. The facing of a door is decided in order to avoid the smoke or germs.

19 Cheng, Jianjun. Feng Shui Yu Jian Zhu (Feng shui and Architecture), (Beijing: Zhong Yang Bian Yi Chu Ban She, 2010), 68.
This model is a 1:100 sectional model, it is designed by incorporating the impact of the wind and sun light. By giving large roofs and a choice of materials, the interior street feels like you are walking in a chinese town, at the entrance I use the release after press technique. You walk in to a dark space, at the end the light shines from the stairs to lead you up to the main interior street. The roof on the north side is curved up, the purpose of that is to catch the south light and bounce it back to the interior so that the north side of roof will not be too dark. The interior street is raised up to first floor level. At the ground floor it is a car park, the car park space is divided into two parts. As the wind at my site blows from the south west and wind is a key factor to consider in feng shui, how to use the wind becomes important. In the photo the wind blows from right to the left. The wind hit the first walls on the right then it will bounce in all directions, the wind bounces from the left to the right and will hit each other and reduce its strength, only the wind which travels up will past the roof light and go in to the main interior space. The wind which passes the first wall which is the entrance of the inside carpark will finally hit the wall and move up through the inside roof light. Then all the wind can pass through the roof light on the top left. By doing all of these I create a slow moving wind to refresh the air inside of my building, which is the critical in the study of feng shui. The south facade is designed as a transparent facade, it functions as living spaces. I will plant trees along the south side, in the summer time the trees can block some of the strong sunlight and during the winter when the leaves fall down all light can pass through. Letting natural become a part of my architecture helps to connect the human with the natural.
By all above factors I find that the main idea of feng shui is to use natural slow wind to refresh the interior air, keeping the air in the space fresh and warm to achieve the idea of creating a healthy shelter for people to live.

Here is the other two of 1:100 models, for testing light and space quality.
conclusion

Looking back to Junichiro Tanizaki's point, beauty is actually the concept that builds up from real life\(^\text{22}\). Attempting to create or design buildings in the west with eastern cultural attributes and see how the people from the other culture can get a new understanding from it makes for an interesting challenge.

\(^{22}\) Tanizaki, Jun’ichirō. In Praise of Shadows, 18.
Final Project

This is my final project, which is located beside the people’s park and the limerick train station. It is functioned as a language school and a high density housing. It creates a public space between these two functions, providing opportunity for people who study in the language school to learn language from the foreigners who live in the high density housing.

This project is designed by using light to direct and link the spaces, to achieve the purpose of ‘views change while you moving through the spaces’. 
This is 1:50 model of the entrance at the public part of my building, which is the school part. It connects the outside and the inside public spaces. Light will guide you to walk through the space and the same time let you experience the different quality of light, after few turns, then you finally arrive at the main public space inside.

This is 1:50 model of the entrance at the private part of my building, which is the living area. Light also guides you through the space, and brings you to the main public space inside.
By creating the cross movement in the public space, it gives opportunity for students who want to learn language to communicate with the people who live in the high density housing. At the ground floor, your view is limited, while you are moving through the space, you will always arrive at turns, and open up a new view each time. This is the view of terrace at the first floor level, the view is quite open, as light comes from the outside, you can see through the buildings, and give a sense of transparent of the space.
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