

Original Paper

The Science and Religion behind Western Classical
Architecture—Illustrated by the Examples of the Pantheon and
Notre Dame Cathedral

Huang Yuwei^{1*}

¹ Mathematics and Applied Mathematics, Yunnan University, China

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Abstract

Architecture is the language of the earth, and light is the language of the sky. When the architecture opens a hole, the flowing light tilts down, and a dialogue between man and God unfolds, the science and religion behind it also tells a story. Great architects can not only build in static space, but also capture the dynamic light to become a part of the building. This paper takes the Pantheon and Notre Dame as examples to explore the scientific connotation and humanistic spirit behind them.

Keywords

Light, Pantheon, Notre Dame, scientific connotation, humanistic spirit

1. Introduction

Architecture is the language of the earth, and light is the language of the sky. When the architecture opens a hole, the flowing light tilts down, and a dialogue between man and God unfolds, the science and religion behind it also tells a story.

Science helps mankind to solve the mystery of nature, and even in the invisible world, the glory of science never leaves. There is science behind everything, and science in architecture is even more beautiful. The columns of the Parthenon, the dome of the Pantheon, the rose window of Notre Dame Cathedral, and the treatment of the material and texture of the surface of the Medici family residence all reflect the beauty of science. The scientific truth behind architecture is fascinating, and the technical means it contains help people better understand the spatial structure and surface design of architecture. Religion is the deepest thought system of human beings, which reflects the spiritual pursuit of human beings. As Hegel said, “Art to its highest stage is directly related to religion”. Since ancient times, man has composed poems, painted paintings and created sculptures for the gods, and devoted almost all

kinds of art forms to religion, including architecture. Buildings with religious significance not only meet the utilitarian needs of human existence, but also serve as a space for the spiritual sustenance of human beings. Behind religious buildings are thoughts on human beings and thoughts on forces beyond human beings.

From the boldly exposed skylight in the large dome of the ancient Roman Pantheon, the colorful light of Notre Dame Cathedral through the original stained windows, the corbusier lang dynamic light fragrant church, the church to tadao ando light in the light of the holy cross, the architect for the use of light, not just the effect of illumination, make originally building adds vitality and dynamic behind the scientific truth, religious culture fascinates people.

This article will take the dome of the Pantheon in Rome and the stained glass windows of Notre Dame Cathedral as examples to compare the similarities and differences in the application of light in the two buildings, and analyze the cultural connotations of scientific principles and religious views behind them.

2. Direct Dialogue—The Pantheon-esque Great Dome

2.1 Historical Background

The Pantheon was first built at the end of the 1st century BC by Agrippa. In order to express gratitude to Caesar for his favor, Agrippa planned to build a “Pantheon”, which means “a temple dedicated to all gods”. The Pantheon has encountered several fires. Due to the large number of wooden structures inside, the Pantheon had almost completely collapsed in Hadrian’s time, and reconstruction is the best way. Therefore, the Pantheon we see in later generations was completely rebuilt by Hadrian. The front of the temple is engraved with “M. AGRIPPA L. F. COS TERTIVM FECIT”, which means that it was built by Marcus Agrippa. This was carved by Hadrian to show respect to the first builder. According to the results of archaeological research, it was also confirmed that the original Pantheon was not round but square, so today’s large dome and the circular structure at the bottom were reconstructed by Emperor Hadrian.

First of all, as a builder, one of the three responsibilities of the emperor in the Roman era was to improve public facilities, especially for the repair of waterways. Hadrian is different from Trajan. Trajan really entrusted all the things related to architecture to the Greek architect Apolodorus who was born in Damascus, and Hadrian belonged to Julius Caesar. For one type, he has his own ideas, and what architects and engineers need to do is to turn his ideas into reality. Hadrian’s architects are not like Apollo Doros. As long as they understand Trajan’s character and what he wants, they can fully demonstrate their talents as architects. However, because Hadrian is not an architectural expert, they will not be bound by architectural concepts. For example, the temple of Venus designed by Hadrian—the two goddesses are connected back to back, which is an unprecedented architectural style. This back-to-back shrine design style often appears in Chinese temples.

Secondly, the architectural features of Rome:

At that time they invented the method of construction, and they made many amazing things in this way, “Romanesque”. This “Roman” has a meaning: the unity of means, the force of intent, the classification of components. The great domes, the drums that supported them, the mighty arches, all cemented with natural Roman cement, are still a marvel. They are great builders (Note 1).

The characteristics of Roman architecture, from the architectural style, mainly reflected in the arch, arch and dome style; In terms of construction methods, Rome lacks skilled stonemasons but has abundant labor force. It is not enough to master the exquisite stone processing technology, and it is easier to master the mixing, handling and concrete pouring methods. In view of the backward technology and abundant productivity, the simple and planned way is more suitable for the group to complete together. Therefore, on the one hand, the Roman architectural way embodies the unity of military and practical. In terms of the overall artistic effect, the central part is uplifted upward and the vertical line has a certain independent nature, which produces a noble and light feeling (Zhang, 2008); From the point of view of space structure, the Greek architecture, pay attention to the external structure of Rome, pay attention to the internal structure building, in “Towards Architecture”, Le Corbusier mentioned that the architecture of ancient Rome was very tight, and there was almost no urban layout planning (Note 2).

2.2 Technical Means - Hole

The wall is good for people. It uses thickness and height to protect humans. When humans cut a hole in the wall, humans see better things.

The use of light in the Pantheon is direct. The opening in the dome is the only source of light. The entrance of the cave is centered, in the middle of the honeycomb shrine. The size of the cave entrance is a small cave entrance relative to the entire temple. The light can be concentrated. Only a small part around the center of the circle is light, and the rest is unclear. It is like the light falling on the theater. The protagonist is average, at this time people can focus more on the central position, expressing emotions with the mouth without distraction. All in all, the opening of the Pantheon is simpler than that of modern buildings. Although there is no complicated cross-section structure and cumbersome design, it is a huge breakthrough in architecture and a classic of light architecture.

3. Implied Expression—Notre Dame Cathedral

3.1 Historical Background

In the 12th century, new cities developed in the advanced regions of Western Europe. At the same time, cities were liberated from feudal rule in full swing, driven by handicrafts and commerce. At this time, the people’s consciousness of liberation and the centralized system made the architecture better sublimated—Gothic architecture emerged as The Times required. It is different from the Roman church—the deep light color and stained glass Windows break the darkness and weight of the Roman church. The wall is no longer simply placed in a hole. People draw geometric patterns on it, frame it with gold and silver, and decorate it with stained glass. Various forms occupy the whole wall, and light

shines through the transparent building, creating a holy atmosphere through the colorful colors.

The art of stained-glass Windows in Gothic churches is a wonderful work in the history of world art. It comes into being with the rise of the architectural art of Gothic churches and the prosperity of Christian thought. Danner wrote passionately in *Philosophy of Art*: “The light poured in through stained glass becomes blood-red, purple and topaz, a mysterious flame of beaded jewels, a strange illumination, like a window to the kingdom of heaven”.

Notre Dame Cathedral is the representative of gothic architecture, which inherits and develops the style of Roman architecture, and has the unique charm of Gothic.

3.2 Technical Means - Glass Window

Gothic architecture is different from Roman architecture in that it uses pointed arches and does not need to be supported by thick walls as in Roman architecture, so there is a lot of space for windows. There are also a lot of emphasis on the use of glass stained windows in the Gothic architecture. The colorful stained windows against the light make the church more beautiful and mysterious. In the church, a large area of windows is used to replace the function of the wall, and at the same time, it also solves the dull and depressing problem of insufficient lighting in the Roman church building. In the architectural structure, the balcony and porch are eliminated in the building to save More side corridor area is given to painted stained windows, and creates a mysterious and beautiful atmosphere inside the church, which shows the importance of stained glass windows in Gothic architecture (Xie, 2020).

The glass manufacturing technology at that time complemented the development of Gothic architecture. In the beginning, the transparency of the glass windows was low and the area was small. The architects used the frame splicing method to combine the colored glass. In the later period, as the glass technology continued to improve, the glass was continuously purified, and larger types of glass windows could be created. , So the later glass windows are mostly painted on the glass windows with colored pigments. The stained-glass windows of Notre-Dame Cathedral were built in an early stage, so the colorful light in the interior comes from the primary colors of the glass.

Because of the low level of human education at that time, very few people could read the Bible through words, so pictures were needed to help people understand and perceive the Bible story, so this kind of beautiful stained-glass window painting became the Bible of illiterate believers and played a role in the secularization of religion. The types of flower window are divided into three types: 1) Rose window, with a complicated structure to add a thing; 2) High window, due to its high position, mainly contains large figures such as The Virgin Mary or the apostle; 3) Stained glass Windows on ground floors, with biblical themes; These colorful mosaics and window-panes, with their ICONS and their profusion of decorative patterns, were dazzling and intoxicating, shimmering in the daylight and flickering against the candlelight at night. The treatment of this internal space and the creation of the space atmosphere add to the mystery and terror and gorgeous inside the church.

When people approach the church, they can not only have an appreciation of the decorative beauty, but also the architecture can resonate with people. On the glass window, the round and surrounding railings

are also decorated with different rose Windows to symbolize heaven, and the Saint is also painted on the glass window, with colorful colors and special decorations, as if watching the scene on the stage. Vitreous flower window can depend on the light to pass through and give birth to colourful, with its light color wonderful and attractive (Xie, 2020).

4. Comparison of Cultural Connotations

A sky in the Pantheon is a dialogue between man and nature, self-centered and self-centered growth; the splendor of Notre-Dame de Paris is the sublimation of the inner soul.

4.1 Rome-self-centered, Transcended Self-centered

The Romans spent their entire life thinking and interpreting themselves and nature.

The Roman spirit was a peasant and a soldier (Note 3). The farmer who works with the sun and goes to bed with the sun needs patience as well as hard work. He needs to plan and prepare in advance according to the season, sow seeds and plow fields, and he needs to compromise, continue to work hard, and remain patient when uncontrollable disasters such as insect infestations and heavy rains come. Their lives go on as they should, and even when external forces break the balance, they can continue to live by the old rules. The land is all their life, and their dreams are also related to the land. Their virtues are honesty, thrift, perseverance, competence, and humility towards great things; At the same time, their feelings for the land are also flawed, unable to escape the fate of a higher power. The spirit of soldiers and the spirit of agriculture have something in common, but there are also breakthroughs. On the one hand, the soldiers strictly observe discipline and follow orders; On the other hand, they attribute “good luck” to a general who won. They have been to many places, met many people, and copied some of the good manners of others. At the same time, they want to rise to the top and have a strong desire for advancement. Unfortunately, for them, what he was doing was also the future, when the war was over, when there was land to farm and farms to live on, and for the soldiers, the smile in that corner of the home was greater than anything else.

The Spirit of the Romans influenced their perception of individual and natural power, and they were keenly aware that there were individual and collective “forces” outside of the human race that could never be ignored (Note 3). That is, the farmer to nature, the soldier to providence, the power of which, if he refuses, he suffers; if he reluctantly obeies, he falls victim to a higher power; if he is willing to obey, he may be among his collaborators. The spirit of peasants and soldiers brought strict order to Rome and also brought convenience to the ruling class. The spirit of order was embodied in Roman strategies, provisions and legislation.

On the one hand, the Romans praised that they could be self-sufficient, brave and good at fighting, on the other hand they entrusted their destiny to nature. They swayed on the boundaries of self-centeredness, so the dome of the Pantheon became a window for them to think about self-worship and nature worship.

The Pantheon was built in Rome where the imperial power was concentrated. Because of the

monumentality and symbolism brought by religious architecture, it could not escape the destiny of serving politics and embody political consciousness. At that time, Rome had the ambition to expand and conquer, and the entrance of the Pantheon also explained this well. They not only wanted to conquer other countries, nations and even natural forces.

A dome is naked and connected to the sky. There are no other windows. Wind, rain, and light are wrapped lightly on the people and on the marble floor. Different temperatures merge with each other, and the words of man and nature are hidden in it. This hole records the rhythm of the surface of the universe—the alternation of day and night, the change of seasons. A Greek philosopher once said:

The rational soul roams the entire universe and the surrounding void, inquiring about the nature of all things. When it reaches infinity, it not only understands, but also studies the meaning of the periodic regeneration of the universe. These studies are that the rational soul recognizes such a truth, and those who come later will see nothing new and strange, and those who go first never see anything that we cannot understand. In this sense, it can be said that any reasonable 40-year-old person can—according to the uniformity of the natural world—understand the entire past and future (Note 4).

Looking out from the hole, it was as if soul had been injected into the whole universe. While the Romans felt that their hands had built such a great structure, they were attracted by the rhythms of the universe overhead—that there was nature above human power, understanding the truths of life and death, laws, the past and the future. The Pantheon not only shows the farmer's love for the earth and the sky, but also the soldier's ambition to fight on the battlefield, as well as his obedience and confrontation with more mysterious forces.

4.2 Notre Dame Cathedral—The Man behind the Primary Color—the Contradiction between God and Man

Looking at the beauty of matter leads to an understanding of God, and stained glass Windows lead to revelation of God.

The space effect and religious significance of the stained glass Windows and light in Notre Dame meet the needs of The Christian spiritual worship, which is the means and expression carrier of religious belief. On the one hand, it combines the solemn mystery of Christianity with the extraordinary imagination, endowing the colorful flower window with the symbol of heaven's window, eternal rose, god's sight and so on. On the other hand, the form is materialized. Abstract stories are depicted on the Windows to convey people's religious belief, religious emotion, religious experience and religious feelings. The stained-glass Windows draw a line between the mundane and the pure, and keep the holy in the church. The whole church is dazzled, mysterious and awe-inspiring, so that the feeling of transcendence is aroused. People use this method to proclaim the glory of God and experience the power of that era (Zhao, 2007).

In Christianity, God has absolute power over people, and people have original sin. Only by believing in God can we redeem ourselves and enter heaven. Adam and Eve were punished for breaking The rules

of God, so human beings are born with sin and can only be saved by believing in God. Notre Dame DE Paris has also been trying to create a “sin” atmosphere, color behind the window light, color foil, graphic style foil out of the kingdom of heaven has inspired people’s guilt, light and dark, sin and guilt, hope and despair, alternately spirit soar, trampled in the flesh, god is the master of the absolute, and people must obey completely, this is god in Christianity - the basic attitude of a relationship.

However, from Notre Dame we can see the contradiction with the Christian concept of God - man. Looking at the beauty of matter can lead to the understanding of God, and the stained glass window leads to the revelation of God, but the colors are brilliant and colorful and sparkling and full of earthly joy.

At that time, saint Bernard, the most authoritative saint, strongly opposed the civil culture to enter the church, and prohibited the use of decoration, stained glass Windows and Mosaic patterns in the interior of the church. However, citizens and architects thought this was not in line with their pursuit of beauty, so they got the stained glass Windows of Notre Dame cathedral. In addition, like the overall upward sense of the church, seems to be integrated with the kingdom of heaven, the Biblical tower of Babel, the planned tower of Babel that angered God, the Gothic church is like the incarnation of The tower of Babel, a symbol of human resistance to God. There is a huge contradiction between the scientific nature and human nature of the church structure and the belief in God.

Two seemingly contradictory concepts of god and man exist at the same time behind the stained glass window, one is the insurmountable gap between God and man, the other is man’s struggle against fate, trying to get rid of “human nature” and draw closer to “divine nature”. When the light and indistinct primary color of the window, the complex contradiction between man and God has been transmitted to today.

5. Conclusion

Behind the light, we lament the wisdom of mankind and the cultural connotation behind it. In the Pantheon in Rome and Notre Dame de Paris, we have seen people use scientific knowledge to solve architectural problems, and at the same time understand people’s worship of nature and gods, and breakthroughs in their own power. The traditional view of nature in the West has a profound historical origin. Ancient Roman culture reflects the idea of man wanting to overcome nature. This is especially true for Romanesque architecture and Gothic architecture. The complex relationship between the nature behind the architecture, the people themselves and those that are neither natural nor human, is worth stopping for everyone.

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Notes

Note 1. Le Corbusier, *Towards Architecture*, translated by Chen Zhihua, p. 35, Tianjin Science and Architecture Press, 1991.

Note 2. le test BaiXi yeah, *towards the building*, cf, page 130, tianjin science building press, 1991.

Note 3. R H Barlow, *Romans*, translated by Huang Tao, p. 3, Shanghai People's Publishing House, 2000.

Note 4. Mark Aurelius, *Meditations*, Volume 11, Chapter 1.