

Spiritual Manifestation of Natural Light in Sacred Buildings: A Comparative Study

^{1*} Neda Ziabakhsh, ² Seyed Mostafa Mokhtabad Amrei

¹Ph.D. Department of Art and Architecture, Science and Research Branch, Islamic Azad University, Tehran, Iran

²Ph.D.Associate Professor, Dept of Art Research, Faculty of Art, Tarbiat Modares University, Tehran, Iran

Recieved 13.07.2010; Accepted 07.03.2011

ABSTRACT: The main sources of all natural light are the sun, the moon and the stars. In other words, the principle source of illumination is the light as mediated by atmosphere. According to some philosophers, spiritual and holy light include not only material and quantified aspect, but because of non-physical properties it treats as a spiritual connector between God and man. The light is the main part of existence which not only contacts to the surface of objects, but also helps them to form. Light is the key of finding space fundamental in making holy places meaningful. This paper tries to make a comparative analysis about the role of the light in some of most famous sacred buildings around the world. As such, the methodology preferred in this piece of research is based on descriptive, analytic and comparative method

Keywords: *Natural light, sacred buildings, Architectural themes, comparative*

INTRODUCTION

Faith exists as long as there is human life on earth. However, sense of divinity depending on faith and how people live with it change over time. This change often affects the identity of religious space. Besides, the architectural transformations affect the spatial expression of the religious space. As light is essence for identity of space and inherence in the spatial expression, the divine light has always been under the change of meaning and shape. The history of day lighting dates, of course, from the beginning of time starting with natural light entering the mouth of caves. Perhaps the first civilized application of the day lighting was the Roman Patio house. After 1900, the day light began competing with a number of artificial lights, up to the point when it appeared to be irrelevant, having as its nadir the development of "Burolandschaft" when buildings could be of infinite depth.

*Corresponding Author Email: ziabakhsh.neda@gmail.com

Light in Greece

In Greek belief, human is the best creation and the highest worth of nature. Greeks created democracy in art with natural human face in their statues. About human worshipping, they say: "in comparison with eastern worshipping, the real days of Greece history seems as appearing new imagination of human. Europe's cultural history should start with Greece" (Jaeger, 1978, 145) From the climatic point of view, Greece cold in winter and dry in summer. As Greeks liked nature and natural environment, they thought that mountains, jungles, seas and sky are the houses of their Gods. They believed "Zeus" lived at the top of highest climax (Shulz, 1996, 116) Greeks lacked a particular God and believed in various types of Gods. Changing and evolution were the main parts of the Greek culture. Their civilization was based on three main aspects: human, nature and wisdom (Gardner, 1991, 117-118) The ancient architecture of Greek consequently was known by temples. As such, temple had a unique mass with bright surfaces. But there are some speculations

that situating temples had been accidental and they did not construct any magnificent empire building for their kings. They operate their ceremonies in open spaces. "Aristotle" persisted and said: "The main point of locating a temple was to make it visible and lavish from around.

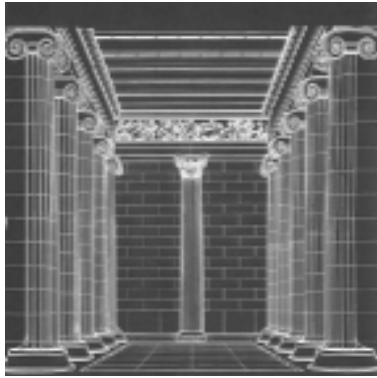


Fig. 1: Apolon temple

The temple should be predominant among other building structures" (Gardner, 1991, 45). The temple structure, as usual, consisted of one or two rooms called "Maghsoure". These rooms possess single door without any window but there is some porticos or two stones between some projecting walls. Being statue-like and inability of interior movement are two features of Greek temples. To their belief, God should reside in the darkness; hence, they built the main room of the temple without windows. Wood, marble and brick were the main building materials in that era. (Gardner, 1991, 128) Judgment about Greek temples appears according to its constructional elements. For example, in Apollo temple, a huge building is designed which involves several perimeter columns. It consists of a main and central space. In Greek temple, the only place where men can walk is perimeter porticos which are situated around a central room. Portico and Ivan are the unique places for taking a glimpse of the light. In Greece era, these are located mostly at covered spaces.

Light in Rome

The Great Roman Empire had its dominance from 753 B.C up to 500 years B.C. Here too, human was the main axis of existence. Romans believed in the luck and fortune goddesses. They also kept their gods and goddesses in the dark space "Maghsoure" like that of Greeks. Light was a brilliant element in this era (Bonkor, 2005, 10) Roman temples, compare to later periods, included no new innovations. They built their temples by imitation Greek methods and designs. The exterior view of sacred building was akin to interior spaces. The axis was very important point (Weinberg, 1965, 479). Symmetry was much clear in circular and rectangular spaces and the central plan had key role. Zevi believes that "Romans had powerful inspiration about subjects which were related to spaces, masses and finally architecture.



Fig. 2: Pantheon's interior view

Pantheon, which was rebuilt during the 2nd century after consecutive fires, hosts the light under its great dome in the form of daylight and the sunlight pattern. The light shapes the Pantheon's paradigm as both literal & metaphorical use of light presents the sense of space together with divine beauty (Semmes, 2005, 54). The daylight diffuses gently in the entire interior space while the sunlight falls directly inside from the oculus and moves all day long on the coffers of the inner dome surface. These two contrary movements together transform the attitude of sunlight and daylight from the natural to the spiritual ones. The spiritual light plays an important role when visitors perceive it standing beneath the oculus, as they perceive the power of the nature via sunlight and divine of all gods in this sense of space via the daylight.



Fig. 3: Exterior view of Pantheon

Although the facade of the Pantheon with its stately Corinthian portico is beautiful, back of the building is more elemental. The unadorned brick relieving arches groan under the weight of the dome, the huge cylinder possesses a fierce, primitive force (Williamson, 2008, 98) The magical light within the Pantheon assures that the immense room, where pagan gods and goddesses once peered down from their places of honor, is never the same, changing with the seasons, from morning to afternoon, and even from moment to moment as cloud drifts across the sky. The shaft of light from the oculus slashes across the cavernous space, reflecting back up from the polished marble floors. Tempered and softened, it penetrates openings above niches

hollowed out of 21 foot thick masonry walls, illuminating the inner recesses with a silvery luminescence. For the nameless master who conceived this place, the earth was the center of a universe symbolized by the juxtaposition of two perfect forms, a sphere contained within a cylinder. Nowhere can we more clearly observe the truth of Louis Kahn's observation that the structure is the giver of light. It is Kahn's "spent light" vibrating in the silence that infuses the space with energy (Kahn, 1928, 65). So, it is at the Pantheon, a sacred place is dedicated to all of gods. Over and over, we witness the struggle to harness the light in the sacred spaces of Rome: high, hidden windows, top-lit domes, polished floors and walls of marble and travertine that bounce not-quite-spent light against vaulted and coffered ceilings, layers of space screened by travertine walls and gilded baldaquins, where light is filtered until it imparts a faint luminosity to legions of marble saints, martyrs, apostles and popes.

Light in Early Christianity

Christianity has been the most famous religion in the early Christian era. The Greek naturalism also became noticeable in this era. Christian architecture was a revolution so far as light was concerned. The most famous sacred buildings of this kind were churches and tombs. Tombs are designed by central longitudinal plan. This architecture concentrates on creating movement in interior spaces more than the ancient architecture. Church is a place for congregational prayer. A bright Mihrab is situated at the east of the plan; hence, it is one of the brightest parts. The main aim of church designers were disappearing quantities such as materials, shadows, size, scale and texture. Byzantine architecture was much popular during 5th and 6th Christian era and was warranted on Christian religion. Beside horizontal, vertical axis was an important feature in it. Central space of Mihrab became the most important part (Zevi, 1997, 69). Bright surfaces increased interior designs were the combination of protraction and centrality (Shulz, 136-137). Santa Costantza, which was constructed in Rome, was inspired from Pantheon. Its dome was situated over a circular mass which had an internal ambulatory. There was a vestibule before main space of church which has ruined with the passes of time. Ambulatory was semi-dark and a high window was located in it.



Figure. 4: Santa Costantza

Hall had become full of light with huge windows. Aisles had no opening and were dark. Some new latticed elements were

installed which could improved the quality of the light there. Its Mihrab had opening and the light which was glowing from upper level of windows, made it more qualified (Gardner, 1991, 239)

Light in Byzantine

In Byzantine life, Christian faith was taken as the focal point as a shared identity and church was considered the space to celebrate this divinity as heaven on earth (James, 2008, 43). Hagia Sophia was a big building project of Byzantine Emperor Justinian I in the 6th century and it was dedicated to Christ, the 'Holy Wisdom' of God by its name as the 'Church of Holy Wisdom'. Procopius, as an important source of information that time has told that the dome was standing upon the interior circle as if suspended from heaven together with the beauty and light it was providing (Mar, 1996, 120). Light entered Hagia Sophia through a series of windows, 40 of which are strategically located at the base of the dome. According to Procopius, the dome seemed to be hanging suspended "on a golden chain from Heaven." Light struck the gilded mosaics and was reflected and diffused throughout the interior, dissolving matter and creating an environment far removed from the outside world. This brings us back to Anthemios, the architect or physicist who was especially interested in optics, the science of light and vision. Through his manipulation of light and space he was able to create a building whose interior evoked the heavenly kingdom of Jerusalem. In an age where there was no separation of Church and State, it was all about science in the service of religion (Fullerton, 2007, 51). The light of Hagia Sophia impresses the visitors as it gives the impression of coming from God's heaven onto the heaven on earth. Byzantine churches' aim, which was carrying the person's sight upwards towards the central dome (Wixom, 1997, 23), achieved a strong visual effect in Hagia Sophia that was unique for this church (Cormack, 1998, 98). The daylight reflecting from the golden mosaics was taken as a solution for illuminating the interior space (Ertug, 1992, 7) can also be evaluated as supporting the gloomy level of overwhelming spiritual light



Fig. 5: Interior view of Hagia

Byzantine churches' centripetal direction towards the central

dome as if heavenward turned into one direction towards sanctuary at the end via tunnel like naves in medieval churches (Wixom, et al, 1997, 8). The change of direction in architectural context affected the direction of spiritual light. It was still overwhelming in its meaning, but more vertical in its form. In the middle ages, Scholastic philosophy was a method for reconciling ancient classical philosophy with medieval Christian theology (Wikipedia, 2009)

Light in Renaissance

Spiritual space of middle ages converted to renaissance as new sense of creating solid and geometrical organization. Renaissance made world as an imagination of numbers. Instead of changing it to a calm place under God order, humanism became the main axis of the world and the meaning of artist became propounded. The circular design of plan was as the symbol of controlling dynamic energy in axis and organizing space.



Fig. 6: St. Andrea

Sant Andrea al Quirinale was designed by Giovanni Lorenzo Bernini. Again the plan of the main room is elliptical with the long axis contradictorily turned at a right angle to the direction of entry, as Robert Venturi has shown. Around the perimeter, a mysterious light seeps behind altars recessed in niches, suggesting unseen spaces beyond. The space is dominated by a spacious dome. Bernini employs a sumptuous palette of polychrome marble and gold leaf to dazzle the eye and engage the emotions. Sunlight from the clerestory windows angles across the space and illuminates the gilded coffers of the dome, increasing the sense of drama, while the light spilling from the oval lantern hints at unseen realms above. The bright white concave and convex forms, arranged in plan like a six-pointed star and bathed in a luminous light from the clerestory, constantly swell, advance, and recede. The eye is drawn upward toward the culmination, a small, bright oculus topped by a lantern through which is offered a glimpse of the sky and, by implication, the vault of heaven. The raking sunlight of autumn, reminiscent at the Pantheon,

slashes across the dome, casting dramatic shadows and illuminating the opposite wall with an ethereal glow.



Fig. 7: St. Andrea

Light in Baroque

Borromini, in his first independent commission, sees the full force of his compulsive genius. The architect was given only a tiny site to work with. Complicating the problem was San Carlo's location at the intersection of two streets crowning the top of a hill and affording distant views of the city. In the absence of the customary forecourt or piazza, four fountains were provided at the corners of the intersection. The facades provide a masterful essay in Baroque complexities and contradictions, acknowledging both the principal street and the intersection. An over-scaled, convex-concave "billboard," surmounted by a huge oval niche, proclaims to the city the presence of the small church. On the roof, a domed lantern is paired with a columned tower, twisted at forty-five degrees to inflect toward this important crossroad.



Fig. 8: St. Pietro

The effect is one of an unsettling explosion of pent-up energy. As it is seen in Pantheon, the visitor is startled by the spectacle

of the light and space revealed inside. The space is deceptively compact as though the single small room were compressed into an oval to fit the confines of the site, squeezing the space and forcing it to explode vertically. The undulating forms of the exterior are echoed within as a series of overlapping cornices jostle for position above. Above the commotion floats a single, serene, oval dome, covered with interlocking Greek crosses, octagons, and hexagons of diminishing size, creating a masterful illusion of height. The dome culminates in a small, brightly lit, oval lantern that spills diffuse sunlight down over the whole, softly illuminating the space, casting evocative shadows, and bringing to life the squirming bulges and hollows of columns, cornices, piers, and niches. At St. Carlo, Borromini was again forced to work within the

constraints of a tiny site, and inside the confined space his solution is another extraordinary essay in complexity. In contrast to the intimate spirituality of this smaller church, the overwhelming monumentality of the Basilica Di San Pietro the vast adjoining Piazza, and the Vatican never fail to impress the visitor with the imperial might of the church at its apex of power (Rolf, 1998, 145) The sunbeams from the clerestories rake the cavernous spaces and are reflected from the polished marble flooring of the transepts back up to the gilded walls and vaulted ceilings of the windowless transitional spaces behind the piers of the crossing, bathing them in the ethereal glow of spent light. High above Bernini's celebrated Baldacchino, with its corkscrew columns, floats Michelangelo's dome, weightless and serene, sunlight from

The Situation of Appearing Light																			
Closed space						Covered space				Open space				Constructing year	Building	Year	Historical era		
Roof			Wall			Portico		Ivan		Court		Entrance							
Dome		Flat roof	Mihrab		Wall		Interior	Perimeteral	Interior	Perimeteral	Central	Primeteral	Narthex					Frontpiece	
Tholobate	Centre		Short window	High window	Short window	High window													
																350 b.c	Apolon	1200 -30 b.c	Greece
																120 b.c	Pantheon	753 b.c- 410	Roman
																345	Santa costantiza	100-476	Early Christian
																532-537	Hagia sophia	395-1435	Byzantine
																1470	San andrea	1400-1600	Renaissance
																1635	San karlo	1600-1800	Baroque

the clerestories bathing the gigantic mosaic medallions of the pendentives. Finally, at the distance beyond the high altar, the climax of the visitor's spatial journey, Bernini's superhuman-scale throne of St. Peter, beckons amidst a blaze of heavenly amber light from a stained glass window surrounded by an exploding cloud of angels (Zaionc, 1993, 123) Although Rome can no longer claim to be the center of Western civilization and although the earth is no longer the center of our universe, much of the best modern Roman architecture continues to acknowledge the lessons of the city's ancient, early Christian, Renaissance, and Baroque past.

CONCLUSION

The direction of natural light provides the shadow patterns which informs the appearance of objects and surfaces and gives them the appearance that we associate with the natural world. Covered space had much importance in Greek architecture, although the closed space had no opening. Periphery of Ivan and porticos were two main covered spaces which formed shadow and light. After this era, the light transfer and narthex became more important in the Roman architecture. However, the closed spaces had no openings yet, except Pantheon which had an opening at the center of the dome. In the early Christian era, the closed spaces had no opening except some small opening on the tholobate of the dome. Gradually, everything changed up to Byzantine. Closed spaces became more important instead of open and covered ones in the Byzantine architecture. After passing about 10 century, everything became stable. It means that wall, mihrab and dome were three main elements in closed spaces which could transfer light to the church. But the light got materialistic point in Baroque and appeared as ornament. Center of dome became the only part of the closed spaces which had brightness. It seems that there was a return to ancient Roman

architecture. The spirituality of sacred lighting actually belongs to the space and how it builds with sacred imagination. It seems that there was a return to ancient Roman architecture.

REFERENCES

1. Bonkor, Pablo(2005), "The historical importance of natural light in architecture", Mimar, vol.34
2. Cormack, R. (2000), *Byzantine Art*. Oxford University Press, Oxford, UK.
3. Ertug, A. (1992), *Istanbul: City of Domes*. Ahmet Ertug, Istanbul
4. Fullerton, Monica(2007), *History of Art*, OSU & Kenyon College
5. Gardner, Helen(1991), "Art Through the Ages", M. Wildes, Resident Scholar
6. Jaeger, Werner (1987), "Paideia: The Ideals of Greek Culture", New York: Oxford Univ., Press, Vol. I
7. James, L. (2008), "Church. In Byzantium" ed. by R. Cormack and M. Vassiliki, Royal Academy of Arts
8. Kahn, Louis I. Louis I. Kahn: Complete Work 1935-1974 (2nd Rev. and Enl. Ed edition ed.). Birkhauser Verlag AG. pp. 437. ISBN 3764313471.
9. Mar, P. H., 1996. "The description of the Hagia Sophia", Procopius in Internet Medieval Source Book
10. Rolf, Toman, 1998, "Baroque Architecture Sculpture Painting"; Neue Stalling, Germany, Old burg
11. Semes, S. W (2005), "Pantheon Inside". Architecture Week, No: 254
12. Shulz. Christian(1996), "Meaning in Western architecture", Oxford University Press
13. Williamson, 1991, "Brooke Medicine Eagle, Buffalo Woman Comes Singing", New York, Ballantine
14. Weinberg, Kaschnitz(1965), "Mittelmeerische kunst", Berline, Ch. VII
15. Wixom, W. D. and Evans, H. C.(1997), "The Glory of Byzantium", The Metropolitan Museum of Art
16. Zevi (1997) "How should we think about architecture", Links
17. Zaionc, Arthur , 1993, "Catching the Light" , New York, Bantam
18. Online access: www.wikipedia.org
19. Online access: www.architectureweek.com
20. Online access : <http://gbgm-umc.org/umw/bible/procopius.stm>