

## **Spiritual Manifestation of Natural Light in Sacred Buildings: A Comparative Study from Greece to Baroque**

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### **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 or holy light includes not only material and quantified aspect, but being 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 form. In other words, light is the key of finding space fundamental in making holy places meaningful.

The present paper tries to make a comparative analysis of lighting in some of the most famous sacred buildings around the world. As such, the methodology preferred in this piece of research is descriptive, analytic and comparative.

**Keywords: Natural Light, Sacred Buildings, Architectural Features, Comparative Study.**

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## **Introduction**

Faith exists as long as there is human life on earth. However, the 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. Since light is an essence of identity of space and is inherent in the spatial expression, the divine light has always been under constant change in its meaning and shape .

In fact, the application of day lighting dates back to ancient times, 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 lighting, to the extent that it appeared to be irrelevant, having its nadir development of “Burolandschaft” when buildings could be of infinite depth.

## **Lighting in Greece**

In the Greek belief, human being is the best creation and the highest worth of nature. The Greek art conceived democratic principles, with natural human face in their statues.

About human worshipping, Greek history seems manifesting new imagination compare to eastern worshipping. In fact, the European cultural history should start with Greece” (Jaeger, 1978:145).

Environmentally, Greeks experienced cold winter and dry summer. Being bond of nature, they believed that mountains, jungles, seas and sky are God’s abode and “Zeos” lived at the top of the mountain (Shulz, 1996:116).

Greeks believed in various types of Gods, with changing and evolution being the main parts their culture. Indeed, the Greek Civilization was based on three main aspects: human, nature and wisdom (Gardner, 1991:117-118).

The ancient Greek architecture also identified with their temples which were erected with unique mass and bright surfaces. There are some speculations that building temples had been accidental and they did not construct any magnificent empire building for their kings hence, they operate royal ceremonies in open spaces. According to Greek philosopher Aristotle, the aspect behind a temple was to make it visible and lavish from around.



Fig 1. Apolon Temple

It was widely believed that “temple should be predominant among other structures” (Gardner, 1991:45). A temple structure, as usual, consisted of one or two rooms called *naos*. These rooms have a single door without any window but occasionally there were porticos or two stones between projected walls.

Being statue-like and interior movement are two features of Greek temples. As they believed that God should reside in the darkness, they built the main room of the temple without windows. Wood, marbles and bricks were the main building materials (Gardner, 1991:128). Greek temples can be judged from their appearance as building materials. For example, Apolon Temple is a

huge structure designed involving several perimeter columns. It consists of a main and central space.

In Greek temples, the only place where people could walk is porticos around a central room. Porticos are unique places, where ne could take a glimpse of the natural light. These porticos were mostly located at covered spaces.

### Lighting in Rome

The Great Roman Empire was at its peak between 7<sup>th</sup> and 5<sup>th</sup> century B.C. Romans believed in the luck and fortune goddesses. Like Greeks, they also kept their gods and goddesses at dark spaces called *cellas* (Bonkor, 2005:10). Comparatively, Roman temples lacked new innovations and continued imitating Greek methods and designs.

The exterior view of sacred building was akin to interior spaces. The axis was very important point (Weinberg, 1965:479) in Roman architectures. In circular and rectangular spaces, they paid much emphasis on symmetry and the central plan. Zevi (1997) believed that Romans had powerful inspiration about subjects related to space, masses and architecture.



**Fig 2.** Interior Pantheon

Pantheon, which was rebuilt during the 2nd century after consecutive fires, hosts the light under its great dome in the forms of daylight and sunlight. Both literal and metaphorical use of lighting presents the sense of space together with the divine beauty (Semes, 2005:54). The daylight diffuses gently in the interior space while the sunlight falls directly from the oculus and moves whole day on the coffers of the inner dome surface. These two contrary movements transform the sunlight and the daylight from natural to spiritual ones. Visitors perceive these natural lights once they stand beneath the oculus. In other words, the sunlight gives visitors the feeling of the power of nature or they perceive the divinity via daylight.



**Fig 3.** Exterior of Pantheon

Although, the Pantheon has beautiful façade with stately Corinthian portico, its rear side is 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 rays illuminating 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 dedicated to all of gods.

Over and over, we witness an attempt to harness the light in 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 .

### **Lighting during Early Christianity**

Although the Greek naturalism remained noticeable feature during early Christian era, an architectural revolution could be seen, especially with respect to the lighting. The most famous buildings of this kind were churches and tombs

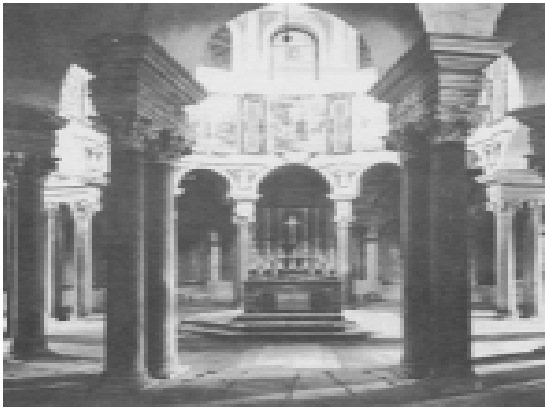
Tombs were designed on a central longitudinal plan. This architecture concentrates more on creating movement in interior spaces compared to ancient architectures. Church is a place for congregational prayer where a bright *altar* is situated on the east hence; it is one of the brightest parts.

Church planners mainly intended to lessen quantities such as materials, shadow, size, scale and texture.

During 5<sup>th</sup> and 6<sup>th</sup> centuries, the Byzantine architecture became very popular. Warranted on the Christianity, those architectures contained some of the important features such as horizontal and vertical axis. Central space of *altar* became the most important part (Zevi, 1997: 69). The bright surface and the increased interior design were the combination of protraction and centrality (Shulz, 136-137).

The Roman structure of Santa Costanza was inspired by the Pantheon. Its dome,

too, was situated over a circular mass with an internal ambulatory. There included a vestibule before the main space which has ruined. The ambulatory was a semi-dark space with a high window.



**Fig 4.** Santa Costanza

The central hall is illuminated due to the light penetrating from huge windows. Aisles, however, remained dark as they lack openings. There included some new latticed elements which could improve the quality of the light. Its altar had an opening and the light illuminating from the upper level of windows, made it more qualified (Gardner, 1991:239).

#### **Lighting during Byzantine Period**

In the Byzantine Empire, Christian faith was the focal point in day-to-day life, church was considered the space to celebrate this divinity as heaven on earth

(James, 2008:43). Hagia Sophia was one of the big building projects of Emperor Justinian I in the 6<sup>th</sup> century. Known as *Church of Holy Wisdom*, it was dedicated to the Jesus Christ. According to Procopius, as an important source of the time, the dome of this church was standing upon the interior circle as if it suspended from the heaven together with the beauty and the 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, an architect and physicist who had particular interests 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).

Visitors are amazed with the light of Hagia Sophia to the extent that it gives them impression of coming from God's heaven onto heaven on earth. The perfection of Byzantine churches which was carrying one's sight upwards towards the central dome (Wixom, 1997:23), reached to their culmination in Hagia Sophia that was unique of its kind (Cormack, 1998:98). The daylight reflecting from the golden mosaics was taken as a solution for illuminating the interior space (Ertug, 1992:7) and could be evaluated as supporting the gloomy level of overwhelming spiritual light.



**Fig 5.**Interior of Hagia Sophia

Centripetal direction of central dome in Byzantine churches was in a way as if heavenward turned into one direction

towards sanctuary at the end via tunnel like naves in medieval churches (Wixom & Evans, 1997:8). The change of direction in architectural context affected the direction of the spiritual light. Although still overwhelmed with meaning, it is more vertical in its form. In middle ages, Scholastic philosophy was a method for reconciling the ancient classical philosophy with the medieval Christian theology (Wikipedia, 2009).

#### **Lighting during Renaissance**

Renaissance could transform the spiritual spaces of middle ages by invoking solid and geometrical designs. Instead of changing the world a calm place under God's command, the Renaissance made humanism as the main axis. Circular plan became the symbol of controlling dynamic energy in axis and organizing space.



**Fig 6.** St. Andrea Church

Saint Andrea al Quirinale Church was designed by Giovanni Lorenzo Bernini with Giovanni de' Rossi in Rome. As Robert Venturi has showed, the plan of the church is elliptical with long axis contradictorily turning at right angle. Around the perimeter, a mysterious light seeping behind altars recessed into niches, suggesting unseen spaces beyond. The space is dominated by a big dome. Bernini employed a sumptuous palette of polychrome marble and gold leaf that dazzle the eyes of visitors and engage their emotions.

Sunlight through clerestory windows splashes across the space and illuminates the gilded coffers of the dome. The light spilling from the oval lantern and hinting at unseen realms augment the sense of visitors.

The bright white concave and convex forms, arranged in plan like a six-pointed stars 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

### **Lighting in Baroque Architectures**

In Baroque architecture, new emphasis was placed on bold massing, colonnades, domes, and light-and-shade. The other Baroque innovation in worldly interiors was the state apartment, a processional sequence of increasingly rich interiors that culminated in a presence chamber or throne room or a state bedroom. 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. The most complicated problem for him was the location of Saint Carlo, at the intersection of two streets crowning the top of a hill and affording distant views



of the city. In the absence of customary forecourt or piazza, four fountains were provided at the corners of the intersection. The façade provides a masterful essay on Baroque's complexities and contradictions, acknowledging both the principal street and the intersection .

An over-scaled, convex -concave "billboard" surmounted by a huge oval niche, proclaims it to be a small church. On its 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 unsettling explosions of pent-up energy.

As seen in the Pantheon, visitors are always amazed by spectacle of light that reveals the

interior space. This space is deceptively compact as though the single small room was 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 also echoed within a series of overlapping cornices jostling 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.

As mentioned, Borromini was again forced to work within the constraints of a tiny site. 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 visitors 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 reflect from the polished marble flooring of the transepts back up to the gilded walls and vaulted ceilings of the windowless transitional spaces behind piers of the crossing, bathing them into the ethereal glow.

Above Bernini's celebrated Baldacchino, with its corkscrew columns, there floats Michelangelo's dome, weightless and serene, sunlight from the clerestories illuminates gigantic mosaic medallions of the pendentives.

Finally, at a distance beyond the high altar, the climax of visitors' spatial journey is Bernini's superhuman-scale throne of Saint Peter. It 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 like the earth that 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 not only make

objects visible rather give them the appearance that we often associate with the natural world.

Despite lacking opening, covered space had much importance in the Greek architecture. In succeeding centuries, especially in the Roman architecture, the light transfer and narthex became more important. Interestingly, the closed spaces lack openings except the Pantheon which has a single opening at the center of the dome. In the early Christian era, too, this phenomenon continued except some small opening on the tholobate of dome. Gradually, everything changed during Byzantine. About 10 centuries later, everything became stable with wall, altar and dome as three main elements in closed spaces which could transfer light into the church. The light got materialistic point in Baroque architecture and preferred simply as ornamental use. In other words, the center of dome became the only part of the closed spaces which had brightness. It seems that there was a return to the ancient Roman architecture.

In short, it can be said that 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 the ancient Roman architecture.

The Situation of Appearing Light

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

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## تجلی معنوی از نور طبیعی در ساختمان‌های مقدس: مطالعه تطبیقی از یونان به سبک باروک

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منابع اصلی از نور طبیعی خورشید، ماه و ستارگان به عبارت دیگر، منبع اصل اشراق نور به عنوان واسطه جو است. با توجه به برخی از فیلسوفان، نور معنوی یا مقدس شامل نه تنها مواد و جنبه‌های کمی، اما خواص غیر فیزیکی آن را به عنوان یک اتصال معنوی بین خدا و انسان رفتار منابع اصلی از نور طبیعی خورشید، ماه و ستارگان به عبارت دیگر، منبع اصل اشراق نور به عنوان واسطه جو است. با توجه به برخی از فیلسوفان، نور معنوی یا مقدس شامل نه تنها مواد و جنبه‌های کمی، اما خواص غیر فیزیکی آن را به عنوان یک اتصال معنوی بین خدا و انسان رفتار. نور بخش عمده‌ای از وجود که نه تنها به سطح از اشیاء، بلکه به آنها کمک می‌کند تشکیل شده است. به عبارت دیگر، نور کلید پیدا کردن فضای اساسی در ساخت اماکن مقدس معنی دار است.

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واژگان کلیدی: نور طبیعی، ساختمان‌های مقدس، ویژگی‌های معماری، مطالعات تطبیقی.

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