LIGHT PHENOMENA IN THE PERCEPTION OF SACRAL ARCHITECTURE

Abstract

Shelter and natural light are fundamental elements of architectural space. Architectural space was defined in so many ways and through different approaches, but one fact was always the same – it has to produce a strong and clear message in order to be properly understood and accepted. Light deals with creative and sometimes spiritual interaction between man-made and natural worlds. Light illuminates and animates. The spiritual and mysterious qualities of light are important elements of religious symbolism in church architecture.

In this research, examples of sacral architecture have been analyzed, among which particular uses, perception and clear observation of light, contributing to understanding of the perceived quality. As a border between two surfaces, edge is a necessary condition for the dramatic perception of light-shadow, but the appearance of surface colour makes a unique mystical atmosphere in sacral architectural spaces. Visual composition achieved by the principle of light-shadow causes the aesthetic perception of satisfaction and psychological balance in viewers' cognition.

Modern churches applies artificial light already in the phase of design as a tool of highlighting. It has to be paid attention to the fact that artificial light has a modifying effect on our sense of time, and it is an essential medium for setting the stage of transcendent architectural design.

Key words: natural light, sacral building, perception, shadow, illumination, harmony, interior space, contrast, artificial light

Introduction

The source of life is of course sunlight. Shelter and natural light are fundamental elements of architectural space. Louis Kahn [3] said: “No space is really architectural space unless it has natural light” and Le Corbusier went as far as saying that “architecture is the wise, correct and magnificent play of volumes collected together under the light”. This allows us to understand the historical interdependent concept of architecture and light. There are many reasons for the renewed interest in natural light, but perhaps even more important are the aspects of daylighting which relate more to the human spirit.

A natural light is free and unlimited. On natural light colours are real, the shapes of objects are clear, and impression of space depth is given by different relations between light and the shadows. Light allows us to define what is around us, by day and night: the changing perception of the things or the bodies on which it impacts, and the space that contains them [2].

Fig. 1. Pantheon, Rome: Light becomes a solid object, supporting the heavy concrete dome

1 Lao-Tse’s, an ancient Chinese philosopher, said that “architecture is not four walls and a roof; it is also, and above all, the air that remains within, the space that these enclose”. [6]
Natural light in architecture

Natural light is the crucial part of the process of man's perception of environment and his ability of understanding and using it. Light gives us the ability to identify our surroundings within the changing perspectives of things that it touches. It defines the space that is contained within the things it impacts. It is a factor of the configuration of architectural space that can be defined in so many ways and through different approaches, but one fact was always the same – it has to produce a strong and clear message in order to be properly understood and accepted. The architects always wanted to take advantage of natural light as far as possible. The proper use of light enhances the space while bad light degrades it. Interior light must provide a pleasant environment, but also psychological and physiological well-being [4]. Light, or absence of light, can also transform some space in each season, each day of the year, each hour of the day, each moment. Light effects depending on [8]: material transparency, color, texture, and orientation to the light; the quality and quantity of light that hits a material; and the overall arrangement of the space and the viewer's position in it.

In sacral architectural space light is an essential medium for setting the stage of transcendent architectural design. Light deals with creative and sometimes spiritual interaction between man-made and natural worlds. Light illuminates and animates. The important elements of religious symbolism in church architecture are spiritual and mysterious qualities of light. Partnership between light and architecture can happen deliberately or it can be purely by chance that the two complement each other so well. For example, the Pantheon in Rome shows that when light and architecture are used together in harmony it can transform a spatial context. The light can help to enlarge a space or make it look smaller, creating the sense of mystery or simply highlighting aspects of the space that is interest.

Lighting principles of sacral buildings

Sacral building, the first of all, is a place that must provide a degree of symbolism, and the architecture is using the natural light as a mainly tool. From the Menhir to the cosmic complex of Stonehenge in England, worshipping light and the astronomic perception in Ancient times to the precise light of Classical Greek architecture, the light that is distilled as it passes from the outside to the interior of Roman architecture. Continuing with the divine light of spaces devoted to the liturgy, the protective light that inclines people to meditation in Romanic architecture, the supernatural light through stained glass windows in Gothic architecture, the humanised light of the Renaissance, the sublime light of the Baroque period. Furthermore, the fluid light that allows us to use glass enclosures in contemporary architecture, which almost manages to eliminate the difference in light between the interior and the exterior. Evidently, windows do more than let in light through glass or transparent material. In early sacral architecture, such as the Pantheon, holes were left in the roof admitting rain as well as light. (Fig. 1.) The apparently floating dome in a renaissance church is a familiar and readily explicable example of
dematerialization. It convinces people they have entered an alternate reality in which familiar rules such as the laws of gravity can be bent. Anyone can experience dematerialization any time that light strikes a surface.

Sacral buildings may be classified into two main categories on the basis of the believers’ attitude to God (or gods) [5]. One of them is built to serve as ‘The House of God’ in the sense that profound thoughts should be born in its interior and that the one who enters should feel it to be the sphere of the transcendent on earth. The Christian archetype of that first kind is the sacral building of the age of the Reformation. The other type is not created in order to promote the relationship of God, but to express the admiration of humankind for God, almost as a kind of sacrifice.

The internal and external application of light in sacral buildings may have several interpretations: indirect use when light (natural light filtering) serves to highlight an emphatic element of the interior (sculpture, painting, a specific area, etc.). Here light is applied in a more or less concentrated and indirect way. The sizing and arrangement of transparent panels with the aim of encouraging meditation and introversion is another instance of the indirect use of lighting. (Fig. 2.) Examples of direct use may primarily be found at communities that worship light or the sun. There are a remarkably wide scale of lighting techniques making use of the annual shift in both the direction and the intensity of daylight as well as the daily cycle of changing lighting conditions from sunrise to sunset. In the early days when Christian congregations were housed by residential buildings, which were later modified through the enlargement of their interior, the size and arrangement of windows was obviously generally the same as for the rest of the residential buildings.

The typically early Christian ‘catacomb atmosphere’ left its mark on sacral buildings for centuries to come. The vaulted space, which was in some places brightly illuminated, had the psychological effect of the cave or a similar building serving to protect our primaeval instincts. Generally speaking, the Ravenna school was the first to handle lighting, the structure of the building, the arrangement of doors and windows and also ornamentation in a perfectly balanced and harmonious manner. The atmosphere of the interior is further enhanced by colours and patterns and it brings to mind the lights of the night. Although the technical and artistic methods applied still resemble the architecture of the age of catacombs, the quality and nature of decorative elements signals already at these early buildings the birth of a new school. It was in the golden age of Ravenna as the first appearance of glory, came to be represented. The symbolism of the glory serves well to explain the characteristics of the interior of sacral

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2 Richard Kelly identified three types of light: ambient luminescence or graded washes, focal glow or highlight, and the play of brilliants or sharp detail. The great variety in architectural concepts of sacral buildings produces. [7]
buildings: the originally sharp contrast between light and shadow evolved through time into even lighting virtually devoid of contrast. The application of a large number of small windows was a novelty that was first seen in purely Byzantine architecture. (Fig. 3.) The arrangement of windows was independent of the points of the compass and generally followed a circular pattern or one with at least two axes of symmetry. The structural knowledge of the Roman period would already have facilitated of more openings in the walls for the sake of lighting. The fact that it was not the case is mainly attributable to the impossibility of heating huge sacral spaces, the rare application of glazing and the function of church buildings as strongholds.

Gothic architecture discovered a new and homogeneous structural system with the application and development of the pointed arch and the ribbed groined vault. It used a skeleton of graceful supports bearing relatively light vaults to envelope a tidy arrangement of large, soaring spaces and flood them with light. The openings were remarkably big and they were glazed in colour. Though the orientation of the church with regard to the compass, seemed to impose a limitation on the lighting effects of the interiors, the application of a great variety of structural as well as decorative elements helped to soften this strict system of light direction creating a unique artistic lighting effect for each building. Gothic cathedral reveals mystical world where sunlight behind stained glass brought scenes from the Bible to real life. Gothic interiors are light and airy today, but in fact they were intended to be dark and mystical. Instead of the deep blues, fiery reds and bright yellows that made up the original panels, many replacement panels are clear [8]. They transmit more light into the interior allowing visitors to see the stone as foreground instead of exclusively as a background. The cathedral in Reims is so much brighter inside because it is fitted with almost clear replacement stained glass panels (Fig. 4); the cathedral in Chartres still has its thick, dark original stained glass panels. (Fig. 5.)

In the age of the Renaissance fine art of religious orientation appeared, to be in striking contrast with the internal lighting and architectural arrangement of the buildings. (Fig. 6.) Contrast is evident between the mathematically accurate designing of the incoming light and the pieces of fine art using colours with extraordinary impulsiveness. Light is often the only applied element that allows a relatively easy recognition of almost all forms. Between the geometrical forms and the angularity of arrangement, light represented Renaissance softness and bore a slight reference to the characteristic and extremely effective lighting in the Baroque, which was from a single direction and therefore instantly intelligible.

In the artistic eras before the Baroque light surrounding holy figures was represented in a way that may be termed general and almost dogmatic. The Baroque brought about a diversion in the representation of the glory: it was shown differently across regions and decades by each artist. Beside the explicit and often colourful Byzantine circles, and the similarly explicit images of the Renaissance, which were already softer in outline and finer in tone, three representations of Baroque origin and almost exclusively typical of that era came to be dominant. It was the golden glory of irregular contour radiating in all directions
is especially typical of sculptures but also present in paintings and it gave an effect of the bright rays of the rising sun around the faces of saints.

**Artificial light in sacral space**

Although the relationship is being looked at from a different angle, artificial light in particular can change and develop sacral architecture. The necessity for the quality and the type of artificial light to be applied all present problems at modern sacral buildings. True, most of them uses natural light as a tool of artistic emphasis or even as a piece of art in itself, thus the interior does not require artificial light. On the other hand, another modern churches applies artificial light already in the phase of design as a tool of highlighting. The various concerts as well as ecclesiastic, national, communal or family holidays housed by the churches may all require their own design of lighting. Other sacral buildings apply artificial light not so much as a tool of artistic expression but as an indispensable instrument of architectural form, the lack of which would make internal space insignificant.

Special attention has to be paid to the fact that artificial light has a modifying effect on our sense of time. The power of regeneration may best be consciously expressed and artistically represented through the proper, *dynamic* use of natural light, while the subjective sense of time slowed down in the sixth dimension may be characterised by the application of *static* artificial lighting. *(Fig. 7.)*

**Conclusion**

Light is a fundamental and inseparable part of architectural conception. Every architect had to know how to break the wall and use the light as the most important constructive element. Visual composition achieved by the principle of light-shadow causes the aesthetic perception of satisfaction and psychological balance in viewers’ cognition. The use of natural light determines the whole concept of using light in all its positive ways to create a soothing and curing ambience of sacral buildings. This research discusses different ways in which light changes architectural sacral space through the history, fooling the eye and sparking the imagination. As a border between two surfaces, edge is a necessary condition for the dramatic perception of light-shadow, but the appearance of surface colour makes a unique mystical atmosphere in sacral architectural spaces. This paper has tried to illustrate the importance of natural light in terms of the past history of architecture and in its relevance in terms of the modern churches.

Today, the great variety in concepts, structural design and the choice of materials no longer permits broad statements concerning the analysis of natural lighting. It is important to note the significance of natural light in sacral architecture, as it clear that light has always been considered during structural decisions. Above all, light is the only material in architecture that cost nothing, but means everything.
References


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