The role of light in formation of a traditional image of architectural space

Abstract

The natural sun light has always been an active factor in formation of local architectural traditions. The sun path impacts the settlement planning, building architecture, and interior zoning, comprising main elements of the architectural identity. In the folk architecture, the light played a symbolic, compositional or decorative role. In particular, eastern orientation of the altar in Ukrainian churches added symbolical lighting effects to the interior, while reflection of the sun light on church domes emphasized the magnitude of the building. The traditional southern orientation of the front façade of houses actually resulted in a colorful, irregular composition of the Ukrainian village, contrast coloristic image of buildings and distinctive image of the scenery. Since the architecture of the Eastern European region is closely connected to the landscape, with the light as one of the main elements, its role in formation of the regional identity should be evaluated appropriately.

Keywords: light, architectural traditions, identity, architectural space.

Modern scientific researches of the role of light in architecture mostly carried out in the context of possibility of application of new technologies for creation of spectacular visual images in the external and internal environment, for visual spatial reconstruction of lost historical objects, for achievement of the emotional expressiveness of public interiors. “Light architecture of the city” and its potential impact on perception of the environment became a popular object of the scientific research along with the traditional material architectural substance. Indeed, modern technological capabilities allow using of light in architecture not only for its intended purpose (to light up the space), but also as a tool for functional zoning of the space, creation of virtual spatial objects, situational transformation of the artistic image of the environment. It appears that architecture has started to actively cooperate with light only recently as a result of widespread use of electrical energy. However, light was also used in architecture in the historical past – for accentuation of forms and colours of buildings, for emotional enrichment of the environment. Although the range of artificial light sources was rather limited at those times, the potential of natural sunlight was used far more intensively. For example, in the time of the summer solstice all longitudinal endfaile of the Amun Temple in Karnak up to the sanctuary was lighted up by the sun that vertically descended to the horizon. In the Egyptian city of Thebes, visual axes of ancient temples were directed at celestial bodies and this was the main factor of their placement in architectural space; for emotional enrichment of the environment; for similarity of the landscape situation, in particular by peculiarities of natural lighting. A traditional regional methodology of organization of architectural space can involve the local landscape in its composition in different ways. Visually closed, interior architectural space prevails in some regions. In other regions, landscape represents one of equal elements of the architectural composition. It would be logical to assume that the use of landscape in spatial organization of environment leads to increase of the role of natural light in formation of the local architectural identity. This assumption is confirmed by the example of the traditional architecture of countries of Central and Eastern Europe, in particularly Ukraine. For many thousand years, architecture of various cultures, that successively populated this area, was closely connected with the local landscape. Not surprisingly, that connection with the natural environment exists at all spatial levels in traditions of the Ukrainian vernacular architecture: in planning of settlements, on adjacent territories and in architecture of buildings, as well as in the interior. Influence of natural light somehow manifested itself everywhere: direction of sunlight determined the character of placement of buildings, their architectural plastics, functional organization of space – factors that are important for the architectural identity of a region. Researchers of the Ukrainian vernacular architecture assert that placement of residential houses in a locality was traditionally linked to cardinal points. There was a general rule that the main façade of a residential house should face the south. Main windows and entrance to the house were located on this side. The main façade never faced the north for at least two reasons. The first objective reason was present in the north of the country, since this direction was considered to be unfavourable and was avoided. The second subjective reason was rooted in pre-Christian beliefs of ancient Ukrainians, who always associated the north with the country of death. As a result of realization of this principle, a specific composition of housing development was formed: “The main façade and one side façade of Ukrainian houses are mostly oriented at southern borders of the yard by absence of any articulate system: houses, drowning in the green, are scattered in a picturesque chaos on hills and highlands.” [5]. In conditions of rugged undulating topography, strategic points were situated in the most low-sloped places, therefore they usually had a complicated curvilinear pattern. It was difficult to adhere to the principle of southern orientation of the main façade of a house while compositionally linking it with the street. Therefore, village houses are often oriented to the street with their side or rear façade or even at an angle. In this case, buildings form a specific picturesque architectural ensemble. In conditions of flat field, direction of streets was coordinated with orientation of residential houses, so more distinct pattern was possible. Spatial location of churches was also coordinated with cardinal points. Traditionally, the altar faced the east, therefore the main entrance faced the west, while the additional entrance – the north. People avoided main gate with entrance failing the north, since this direction was considered to be unfavourable. Y. Taras provides comparative schemes of location of churches in various Ukrainian villages. Their longitudinal axes slightly deviate from the eastern direction to the south and north, forming a small sector [8]. The thing is that construction of churches was started in different seasons, so the eastern direction was identified approximately due to the lack of precise instruments. The temple’s axis was directed at the point of sunrise at the moment of construction start. Therefore, the direction of sunlight essentially influenced the traditional spatial composition of the Ukrainian village.

The sunlight also had a principal importance for perception of architectural forms and coloristics of the environment. The vernacular architecture of Europe has two positions as to colouristic correlation with architecture: visual combination of houses with the natural surrounding due to similarity of the colour gamma, or differentiation of a house from the surrounding due to the colour contrast. “Merger” with landscape is demonstrated by the vernacular architecture of Scandinavian countries. For the Ukrainian tradition, contrast differentiation of a house from the natural surrounding is more typical. The colour contrast was mainly achieved by the white colour of walls of the Ukrainian house. The only exception was the Carpathians and Northern Polissya, where walls preserved the colour of natural wood. The principal significance of the white colour of the Ukrainian house is proved by the following facts. Firstly, light reflection on the white face of a building, white irrespective of their construction – solid wood houses, carcass houses and clay houses were always white [6]. This factor differentiated a Ukrainian house from, for example, the German one, in which various constructive materials on the facade of the carcass house were accentuated by contrasting colours. It is very interesting that the dominance in the symbolic white colour had a higher status as compared with other colours: only the dwelling house could be white, while other buildings in the household were covered by clay of different colour shades. R. Radovych in his research asserts that only exterior walls of the residential section and the mudroom or less frequently – the whole facade – of a cottage were painted white, while the rest of the facade remained unpainted [7]. Therefore, only the dwelling house in the Ukrainian traditional architecture could be entirely white, and this white color indicated the location of the household and his family. It is known that the white colour perfectly reflects sunlight. Therefore, in conditions of direct
The traditional southern orientation of the main facade not only ensures good insolation of rooms, but also fosters visual identification of the house (Ill. 1). White wall surfaces contrast not only with the external surroundings, but also with other architectural elements of the building. In this case, the sunlight increases the contrast owing to deep drop shadows. The traditional Ukrainian house has a four-slope roof that protrudes beyond walls, creating additional functional space. In conditions of intensive lighting, the roof throws a deep shadow on the façade that accentuates the form of the roof while actively contrasting with the lightened part of the white wall. Therefore, though the area of the visible fragment of the wall reduces, the visual effect is intensified. In the wild nature, the white colour acts as a specific “reflector” helping insects and animals orient themselves in the environment. We can assume that the national tradition adopted the method of using white colour from the wild nature.

Level of lightning of different parts of a living accommodation also determines functional zoning in the traditional folk interior. Since windows were concentrated in the southern part of a house, the south-eastern angle was the most light-filled in the interior of a living room. It played the role of a “parlour” – with a big table, icons on the walls, family heirlooms; all familiar with shiny metal materials. Windows were always located on cardinal points, meaning of natural shadows a constant influence spatial organization of the living space, its architecture and colouristics – i.e. elements allowing to visually identify ethnographical affinities to the local architecture. So, preservation of the local architectural identity becomes impossible in conditions of the modern construction without taking into account such characteristics as traditional orientation of facades at cardinal points, meaning of natural shadows for revealing of architectural forms of buildings, need in accentuation of the colour contrast or, visa versa, colouristic combination with the surrounding.

Changes that took place in the architectural and natural environment in the last century essentially deepened the disparity between functional, constructive and visual characteristics of the environment that historically

![Image 1](https://example.com/image1.png)

**Figure 1. White windows of rural dwelling house: A – with full sun light (painting by V. Shcherbakovsky); B – with lunar light (painting by O. Kulchytska).**

...sunlight the white wall of the main southern facade, along- side of other elements painted in various colours, literally "shines in the sun." Thus, the traditional south orientation of the main facade not only ensures good insolation of rooms, but also fosters visual identification of the house (ill.1).

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![Image 2](https://example.com/image2.png)

**Figure 2. Light in the interior of wooden church in Lebedyn [8].**

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developed in the traditional vernacular architecture and the modern construction industry. At the same time, globalization processes in the world architecture incite us to search methods for preservation of the national identity of architectural space [2] without losing all positive characteristics of the modern construction. Therefore, direct reconstruction of traditional architectural space or its separate elements for preservation of the identity “at any costs” is absolutely out of the question. Taking into account local architectural experience, we need to develop a methodology of formation of modern architectural space on the scientific basis, adhering to traditional compositional principles and historically formed aesthetic priorities. Not all factors impacting formation of traditional visual characteristics of the environment can be equally acceptable for using in the current context. For example, traditional for the vernacular architecture functional organization of internal space, materials and constructions, and related decorative ornaments in most cases already do not meet current social needs and modern constructive possibilities. Instead, such factors as a method of interaction of architecture with local landscape, character of spatial composition of architectural space and principle of its colouristic scheme can be realized irrespective of the architectural style and constructive design of separate buildings – compositional elements of this space. These always relevant, “timeless” factors of formation of traditional features of local architecture include the method of using and broad spectrum of using of sunlight at all levels of architectural assimilation of the environment. Importance of natural light for the architectural identity varies in different local traditions. It depends on the role of the natural landscape in traditional architectural composition.

Architecture of Eastern Europe has old traditions of close cooperation with the natural environment. And sunlight, as one of essential components of this environment, plays a very important (however yet underestimated) role in formation of the traditional image of local architecture. Analysis of peculiarities of the local tradition of using natural light and application of its main principles in newly built constructions in the region will help to preserve national identity in conditions of modern architectural space.

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