The natural aspect in the visual comfort of the architectural space of an individual house

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Abstract. When designing an individual apartment building, there are great requirements for the organization of comfortable living conditions. Among the necessary components of the full functioning of the dwelling should be the visual favorability of the architectural space, which is, among other things, in relation to the natural environment in all its diversity. Man is surrounded by nature, which is harmonious and unique in all respects. For this reason, there has always been and is a need to see some of this nature in the architecture of the house and other buildings. In architectural design, natural components are actively involved in enhancing aesthetic harmony. The article is devoted to the study of the role of the natural aspect in ensuring the visual comfort of the architectural environment. The work also considers the importance of the natural component for the visual perception of the architecture of the building, the interior space and the personal territory of the residential building.

1. Introduction
The concept of the unity of architecture and nature, where the object should be harmoniously integrated into a specific natural landscape and serve as its natural continuation, is relevant and modern, despite the fact that it has been known since antiquity. However, often architecture was opposed to the natural environment, which manifested itself in a negative impact on a person and on his perception of the entire architectural space. Modern architecture, and above all eco-friendly, is beginning to pay more and more attention to the interaction of buildings with the natural environment, which is of particular importance for the formation of organic architecture [1-3].

Architecture should not only have a functional value, it should also create emotional comfort for a person. At the same time, the issue of a favorable perception of the architectural environment is closely related to the quality of the visual aspect of the surrounding space [4-6].

2. Relevance and significance. Tasks
When considering the importance of visual comfort for a person, it should be noted that a residential building should first of all ensure favorable visual perception of the whole image of the building, which fully contributes to providing conditions for relaxation, and various types of work and creativity. Representatives of organic architecture concluded that the environment that is as close to nature as possible has the best effect on humans. Thus, it seems urgent to study the relationship of the visual component in architecture with the natural landscape, as well as develop recommendations for
the formation of a comfortable environment in a residential building from the point of view of integration of architecture with the natural environment.

3. Theoretical part
Modern green standards, such as for example LEED, Green Zoom, in addition to environmental friendliness criteria, play an important role of the favorable architectural environment for humans, including visual comfort. In particular, for individual housing construction, the necessary recommendations have become: providing a pleasant view from the window, gardening of the territory, arrangement of the building plot. The natural component, positively displayed in the architectural and spatial solution of a residential building, has a different manifestation [7-11]. To systematize the visual activity of the natural environment, one should consider the features of the relationship between architecture and nature from the point of view of visual auspiciousness.

In the architecture of a residential building, the natural component is manifested in the arrangement of open terraces, patios; in dividing the space of the house into volumes of different sizes and shapes; the naturalness of the material of the enclosing structures (stone, wood); in elements of a decorative solution (carved plat bands, gaps, the ornament of which repeats natural motifs); in the natural color approximation of facades. Examples include Villa Countryside on Lake Como, a beautiful Casa L house in Valle of Bravo, Mexico in complete fusion with nature, made primarily from wood in a private Madrona house.

For the visual space of the interior, natural elements can appear in a color scheme that matches the natural colors of nature; in the formation of open structural elements (for example, supporting columns, supplemented by curved elements in the likeness of natural elements); in solving a system of natural lighting, taking into account the area of the glazed surface, the shape of the window opening, the presence of a second light. For example, ribbon glazing or panoramic windows allow to penetrate not only enough sunlight, but also to open the inner space in the environment as much as possible. Sunlight can further enrich the interior with an ornament if it passes through carved decorative surfaces. A sufficient amount of space also creates a favorable perception of the interior [12-17]. The interior of the “Houses on the Lake” room, shown in Figure 1, combines several techniques for creating a positive internal space in harmony with the external natural environment. The visibility of the background emphasizes the contrast with the natural environment, and at the same time combines the interior and landscape into a single whole. This technique especially enhances the plasticity of the interior space. Natural materials and natural colors in the room are also complemented by the natural colors of the exterior, which creates the impression of a common composition and merging of spaces (Figure 1).

For a household territory, the natural component is manifested primarily in the merger of the architectural complex of buildings with the landscape and the surrounding landscape, in the presence of house gardening. The effect of the visual interaction of the house with nature can be enhanced by compositional unity in architecture, where all elements of the building complement each other. An interesting technique may be the unity of the material for the facade and interior, visually combining the interior with the exterior (Figure 2).

As examples of the various integration of the natural component into architecture in order to ensure visual comfort, we can cite the project of the residential complex of vietnamese architect Vo Trong Nghia. A green array of trees planted in huge containers is embedded in the space of the house and becomes an integral part of both the interior and the space between the living volumes (Figure 3).

A house in the California desert (Kendrick Bangs Kellogg) is noteworthy due to the amazing fusion of architecture with rocky terrain. The architectural solution not only visually united the house and the stone slope into a single composition, but also emphasized the natural beauty of the surrounding landscape.

Another interesting solution is the “Summer House” in Fredericia. The outer shell of the building, resembling a house in shape, is the space under which the residential part itself is located. Between it
and the street, a volume is created connecting the house and the surrounding territory, and at the same time serving as part of the interior (Figure 3)

Figure 1. The interior of the “Houses on the Lake”.

Figure 2. Visual comfort of the architectural space.
It should also be emphasized the role of organic architecture in the active inclusion of natural elements in the appearance of the building. Among the most characteristic features of this architecture can be distinguished silhouettes that are subordinate to the landscape, the use of natural raw materials, careful inscription of the building into the environment, the presence of a variety of kindergartens and open interior spaces. Vivid examples of the organic approach in environmental design can be the work of F.L. Wright's "House over the Waterfall", "House of the Prairie", the house of V.Kh. Winslow at River Forest, Cooney's Riverside home and many others [18-20].

Figure 3. Examples of various integration of the natural component in architecture.

4. Conclusions and practical significance
Based on the analysis of the visual functioning of the natural aspect in architecture, to solve the problem of a favorable perception of the artificial environment of an individual residential building, the use of such techniques as: visual unity of the interior and the surrounding space, variety in shaping and decoration, expanding the spatial boundaries of the house into the natural environment, the use of natural building materials.

Receptions of the relationship between the architecture of an individual house and natural elements can be summarized in the following categories:
- Imitation of nature in the organization of visual space;
- Inclusion of natural elements into the architectural and spatial environment;
- Interaction with the natural environment, organically complementing the appearance of the building

The presented graphics illustrates the influence of natural components and elements of imitation of the natural environment on visual auspiciousness of the architectural space of a residential building (Figure 4, Figure 5).
The natural aspect in architecture plays a significant role not only as a source of resources and environmental sustainability, it additionally provides the visual auspiciousness of the architectural space. Formulated and generalized methods for creating a favorable visual environment can increase the common level of comfort of an individual residential building, its ergonomics and aesthetic appeal.

Figure 4. Receptions of the relationship between the architecture of an individual house and natural elements.

| Natural components, imitation elements natural environment | Graphic image | The effect of visual auspiciousness in an architecturally spatial environment |
|-----------------------------------------------------------|---------------|--------------------------------------------------------------------------------|
|                                                           |               | House architecture | Interior space | Household Territory |
| Sunlight                                                   | ![Sunlight](image1) | Visual auspiciousness | Visual auspiciousness | Visual auspiciousness |
| Landscape                                                  | ![Landscape](image2) | Merging into a single ensemble | Visual relationship with the natural environment | The unity of household territory and environment |
| Green array                                                | ![Green array](image3) | Natural facade decoration | Visual relationship with the natural environment | Visual auspiciousness |

Figure 5. Receptions of the relationship between the architecture and natural elements.
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