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The Importance of Depicting Object Shadows in Building Drawings

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Abstract: This article discusses the clear and confident portrayal of shadows when designing buildings and their components. It focuses on illustrating the trajectory of light and the shadows of building components.
Keywords: Light source, building drawings, shadow direction, axonometry, perspective, orthogonal projection.

During construction, it is not possible to clearly visualize the designed structure without seeing the details and peculiarities of the lines. Learning to see the nuances is essential for the accurate depiction of tangents and curves. Scales are widely used in architectural designs, building facades, and other structures. The use of scales allows for better visualization of the interaction of distinct elements in the drawing and the overall volume of the structure.

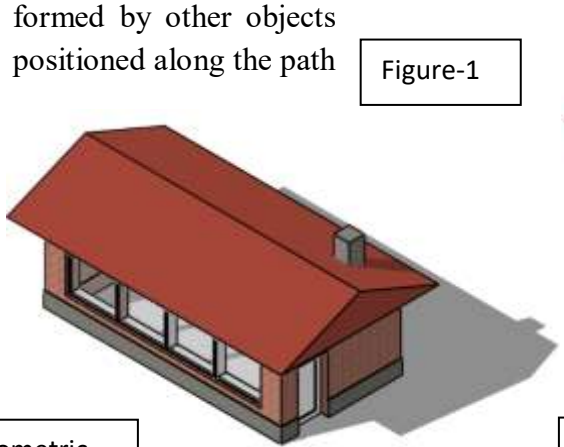
We only perceive the things around us illuminated by light coming from some source. For example, when walking from a dark street into the light, we distinguish the external shapes of things, without understanding their small details and, moreover, their perceived volumes. This is due to the incomplete illumination. On the other hand, strongly lit things also appear as a mere silhouette.

For instance, when the Sun is setting, the light emitted from it illuminates the asphalt uniformly. Therefore, we do not perceive the small elevations and depressions of the asphalt on the road, and the road looks uniformly illuminated to us. If a vehicle passes on such a road, with its headlights on, you can clearly see even the smallest elevations and depressions of the road.

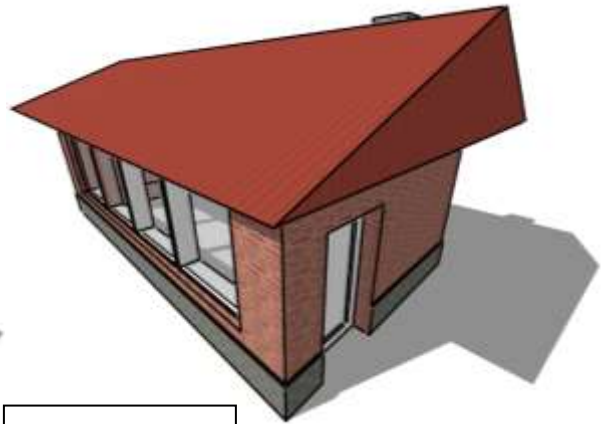
Small details may appear unclear on a flat surface when illuminated from an inappropriate angle. These examples demonstrate that the division of light across the edges of objects aids in defining their shapes.

The part of an object that has not been touched by direct light becomes its shadow. A cast shadow is formed by other objects positioned along the path of an illuminated object or is thrown onto other surfaces. When an object is depicted with its own shadow and a cast shadow, the image becomes more three-dimensional and impactful.

Figure-1



a) Axonometric



b) Perspective

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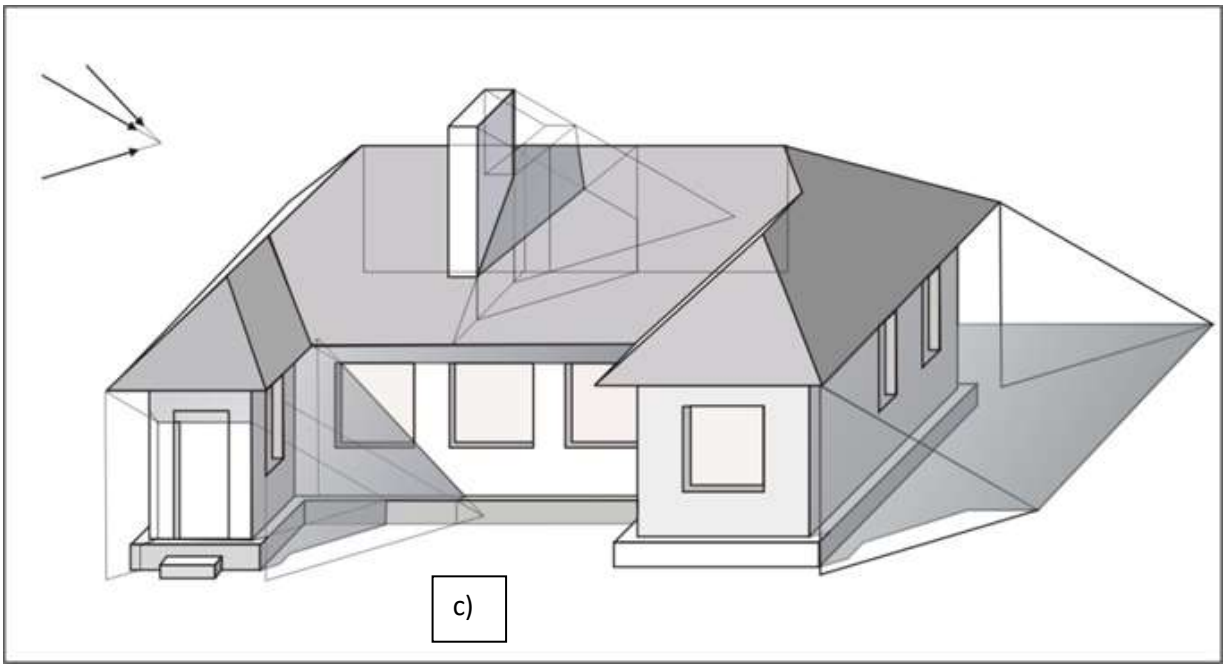
Different parts of an illuminated object are illuminated to varying degrees. Such division of light is a result of the positioning of various parts of an object in relation to the light source.

The above Figures 1 a) and b) depict axonometric and perspective representations of the object and its cast shadows, while c) outlines the cast shadows and the direction of the illumination in plan view. Besides portraying the cast shadow in orthographic projections, the third dimension of the projections



does not indicate the height in the plan or the depth in the elevation.

In representing shadows in orthogonal projections of a building, besides making accurate shadow depictions, the absence of a third dimension in the projections does not indicate the height in the plan or the depth in the elevation.

When creating shadows in architectural drawings, it is essential to consider the physical aspects of the division of light, the propagation of light rays, the distance from the object to the light source, the change in the shadow's length relative to the projected surface, changes in reflections, and other objective factors without focusing solely on the geometric contours of the object's own shadows and cast shadows. In this regard, there may primarily be two types of light sources; the artificial shadow being located not far from the object and the natural shadow being located at a considerably greater distance from the object.

The direction of the light rays can be variational. In orthogonal and axonometric projections, the direction of shadows' creation is often made parallel to one of the diagonals of a cube placed in the projections.

The shadow delineation of the building wall and its volumetric part is manifested in the second figure within the orthogonal projections.

Figure-2

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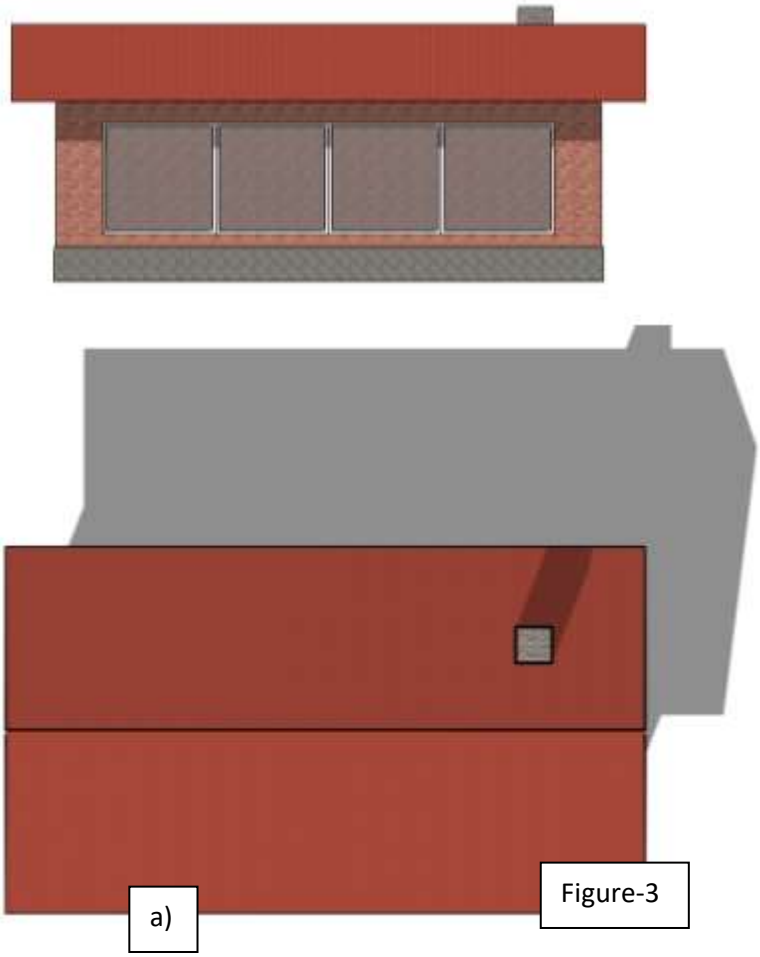
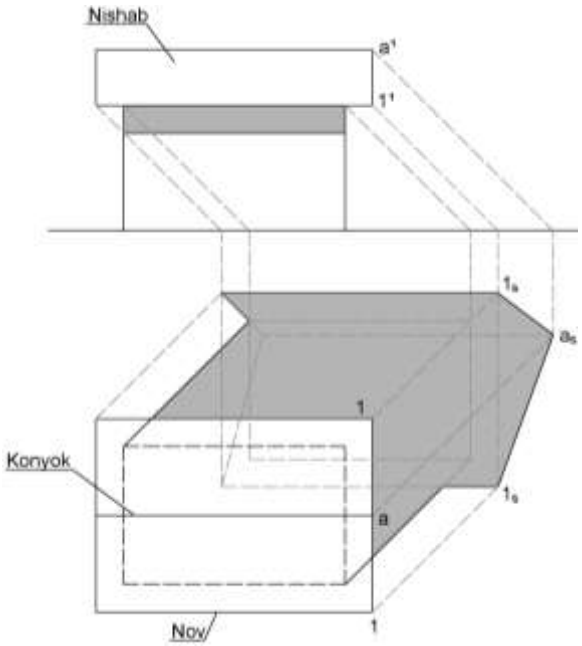


a)



b)

Figure-3

Based on the characteristics of the shadow, the shadow cast by a straight line (AB II) in plan corresponds to the projection of the light ray in the V elevation, and on the facade, it corresponds to the profile of the section turned to the left. The shadow cast by a line (AC IV) corresponds to the projection of the light ray in the V elevation and, in plan, corresponds to the profile of the normal section turned to the left of the section.

In Figure 3, the shadows of the building and its projecting elements are depicted in both orthogonal projection and perspective. The object's own shadows are more prominent in relation to their cast shadows because they are more pronounced from other surfaces. Therefore, in the picture, it is necessary to clearly show the object's own shadow as prominent and the cast shadow as more subdued.

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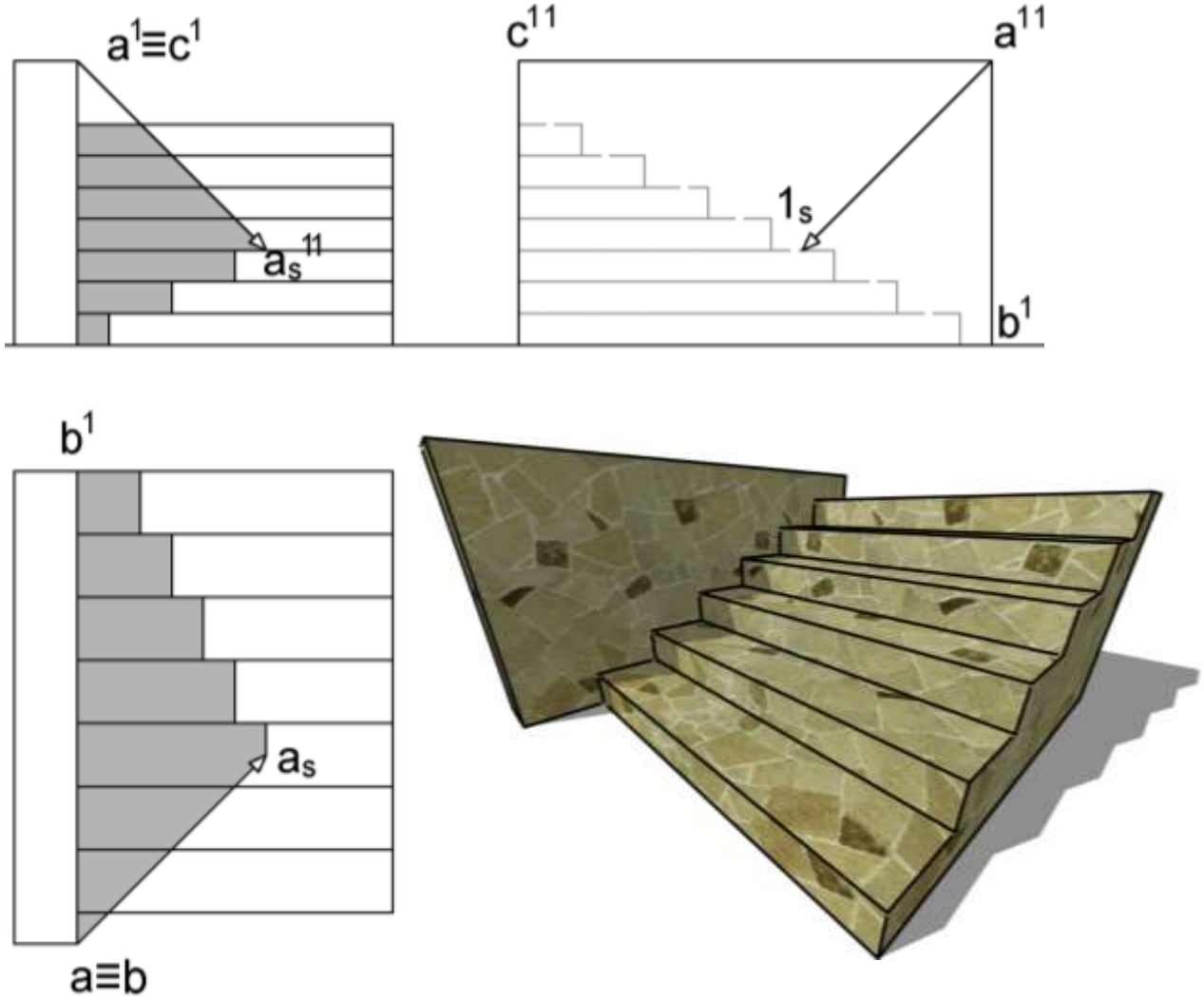

The shadow cast from one object to another determines the shape of the objects. The contour of the cast shadow that falls parallel to it expands to the contour of the shape (the shadow of a triangle is a triangle, the shadow of a square is a square, the shadow of a circle is a circle). When illuminated by parallel light, the cast shadow falling parallel to the object becomes equal to the shape itself. Usually, in most cases, when drawing the shadows of building components, distant light is taken as parallel to each other. This can be illustrated by the following figure. Figure 4 shows the method of creating the shadow cast from the observer to the bottom in perspective, axonometry, and orthogonal projection.

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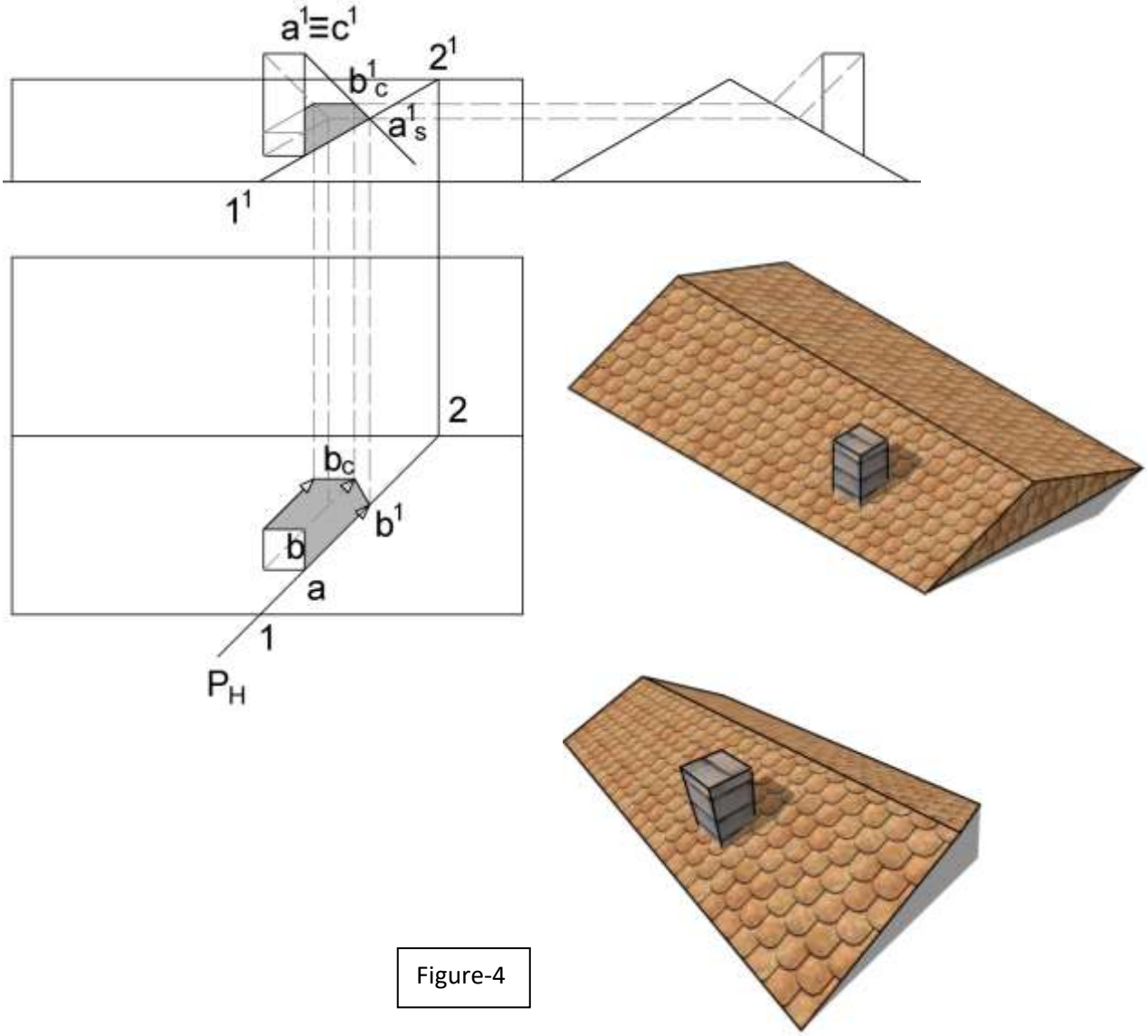

Figure-4

Summarizing, it can be said that drawing and representing the shapes and shadows of natural objects are of great importance in the preparation and presentation of architectural designs, particularly in the creation and portrayal of complex building plans, the appearance of trees, flowers, various technical devices, bridges, and similar complex structures with shadows, holding considerable significance.

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