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REPRESENTING FORM THROUGH LIGHT AND SHADOW IN PENCIL DRAWING

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Abstract. This article examines how light and shadow convey three-dimensional form in pencil drawing. It explains how highlights, halftones, core shadows, reflected light, and cast shadows help the viewer perceive an object's volume and position in space. Using a sphere, a cylinder, and a cube as illustrative examples, the article contrasts the gradual tonal transitions of curved surfaces with the sharper changes in value between flat planes. It also discusses how pencil pressure, hatching, and layering can be used to control tonal values. Particular attention is paid to the distinction between the shadow on an object and the shadow it casts on a neighboring surface. A consistent light direction and carefully controlled tonal relationships help convey a convincing sense of volume and depth.

Keywords: pencil drawing, light and shadow, three-dimensional form, tonal values, reflected light, cast shadow, hatching.

Introduction:

In pencil drawing, the representation of three-dimensional form depends on how tonal values are distributed across a two-dimensional surface. An outline establishes the visible boundaries of an object, while variations in tone show how its surfaces turn toward or away from the light. Gradual tonal transitions can suggest the curvature of a sphere or cylinder, whereas a more abrupt shift in value can mark the junction between two planes of a cube. The cast shadow further helps establish the direction of illumination and the object's position on the supporting surface.

This article examines these principles in the context of foundational drawing instruction at the National Institute of Painting and Design named after Komolidin Behzod in Tashkent, Uzbekistan. The analysis uses three illustrative tasks involving a sphere, a cylinder, and a cube illuminated by a single light source. These forms make it possible to compare how light falls on curved and flat surfaces and to trace the relationship between halftones, core shadows, reflected light, and cast shadows. The tasks also illustrate a common challenge in drawing from observation. A dark mark may be accurate in isolation, yet it can disrupt the sense of volume if its value is inconsistent with the surrounding tones.

The aim of the article is to explain how the arrangement of tonal values conveys volume in pencil drawing and to identify how hatching, pencil pressure, and layering can support that effect. Particular attention is paid to the relationship between shadow on the object itself and shadow cast onto the supporting surface. Through the analysis of the three drawing tasks, the article proposes criteria for assessing whether tonal transitions follow the structure of the form and remain consistent with the direction of the light.

Materials and methods:

The study uses a qualitative comparative analysis of three illustrative pencil-drawing exercises framed in the context of foundational drawing instruction at the National Institute of Painting and Design named after Komolidin Behzod in Tashkent, Uzbekistan. The exercises involve a sphere, a

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cylinder, and a cube, each selected to demonstrate a different relationship between illumination and geometry. The sphere provides a continuous curved surface for examining gradual tonal transitions. The cylinder combines a curved lateral surface with flat end planes, making it possible to examine both gradual shading and changes in value at the junction of these surfaces. The cube provides a basis for comparing the tonal values of adjacent planes oriented at different angles to the light.

The exercises specify matte, light-colored objects placed on a plain supporting surface and illuminated from one side by a single light source. A comparable direction of illumination across the exercises allows the tonal patterns to be interpreted in relation to the geometry of each object. The matte surfaces limit strong reflections, and the plain background makes the cast shadows easier to distinguish. Graphite pencils and drawing paper serve as the materials for the exercises. The analysis considers how pencil pressure, hatching density, and the layering of strokes are used to produce lighter and darker values and to control transitions between them.

The analysis begins by identifying the direction of illumination and distinguishing the illuminated areas, form shadows, and cast shadows. In the sphere exercise, it follows the transition from the most strongly illuminated area through the halftones to the core shadow, taking into account any reflected light visible within the shadowed area. In the cylinder exercise, it examines how the values change across the curved lateral surface and how those values relate to the tone of the visible end plane. In the cube exercise, it compares the relative values of the visible planes and examines whether changes at their shared edges convey their orientation toward the light source. The analysis also considers whether the direction and density of hatching reinforce the curvature of the sphere and cylinder and help distinguish the planes of the cube.

Across all three exercises, the cast shadows are analyzed in terms of their direction, shape, and edge definition. Particular attention is given to the tonal relationships near the point where each object meets the supporting surface, since these relationships help establish the object's position in space. The comparison assesses whether illuminated and shadowed areas are consistent with the direction of the light, whether tonal changes correspond to the geometry of each form, and whether the cast shadow visually anchors the object to the surface. These criteria are used to interpret how the distribution of light and shadow contributes to the perception of volume in each drawing.

Results and Discussion:

The qualitative comparison of the three illustrative exercises shows that the representation of volume depends on how tonal values follow the geometry of each object under a single light source. In the sphere and cylinder exercises, gradual changes in value convey curvature. In the cube exercise, distinct tonal values on adjacent planes reveal changes in surface orientation. Across the three exercises, the cast shadow helps establish the direction of illumination and the object's position on the supporting surface.

In the sphere exercise, the transition from the illuminated area through the halftones to the form shadow conveys the continuous curvature of the surface. The halftones describe the part of the sphere that gradually turns away from the light. Where reflected light is visible within the shadowed area, it produces a localized increase in value. Keeping that reflected light within the overall shadow range helps preserve the distinction between the directly illuminated and shadowed sides. A reflected area rendered too brightly can interrupt the tonal progression and weaken the impression of roundness.

The cylinder exercise combines gradual tonal change across the curved lateral surface with a more distinct change at the rim of the visible end plane. The lateral surface turns progressively away

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from the light, producing a gradation across its width. The value of the end plane depends on its orientation toward the light source. Hatching that follows the curvature can reinforce the sense of roundness, while variations in stroke density and graphite layering help control the transition from light to shadow.

In the cube exercise, volume is conveyed primarily by the relative values of the visible planes. Under a single light source, planes with different orientations can receive different degrees of illumination. A clear tonal change at a shared edge makes the shift in orientation legible, while a relatively consistent value across each plane supports the perception of flatness. Smoothing the transition across a sharp edge can make the corner appear rounded and obscure the geometry of the cube.

The comparison also clarifies the different functions of form shadow and cast shadow. Form shadow describes the portion of the object that turns away from direct illumination. Cast shadow extends over the supporting surface and helps the viewer judge the object's placement. Its direction should be consistent with the position of the light source. Near the point of contact, a darker or more clearly defined area can visually anchor the object to the surface. The definition of the shadow edge elsewhere depends on the lighting conditions.

Within the foundational drawing context of the National Institute of Painting and Design named after Komolidin Behzod in Tashkent, these exercises illustrate a sequence of instructional priorities. Establishing the main light and shadow areas first gives students a tonal structure within which to refine halftones, reflected light, and shadow edges. Pencil pressure, hatching density, and graphite layering can then be assessed by how well they support that structure. The analysis of the three illustrative exercises suggests that a convincing sense of volume comes from coordinating tonal transitions with surface geometry and keeping the form and cast shadows consistent with the same light source.

Conclusion:

The qualitative analysis of three illustrative pencil-drawing exercises demonstrates how light and shadow convey volume when tonal values correspond to the geometry of the object and the direction of illumination. Gradual transitions from light through halftones into form shadow convey the curvature of the sphere and cylinder. In the cube, distinct values on adjacent planes reveal changes in surface orientation. The cylinder combines both effects, with a gradual transition across its curved surface and a clearer change in value where that surface meets the flat end plane. Across all three forms, the cast shadow helps establish the position of the object on the supporting surface.

In the context of foundational drawing instruction at the National Institute of Painting and Design named after Komolidin Behzod in Tashkent, Uzbekistan, the exercises illustrate a practical sequence for teaching tonal drawing. Students can first establish the direction of light and block in the main light and shadow areas. They can then adjust pencil pressure, hatching density, and graphite layering to refine the tonal transitions. A drawing can be assessed by examining whether these transitions describe the shape of the object, whether the form and cast shadows indicate a consistent light direction, and whether the cast shadow makes the object appear to rest on the supporting surface.

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