Shade and Shadow

Lights Dark Brother

Light and Shadow – a unity.

It is only through light and shadow that architects acquire shape.

Lighting Design is Shade and Shadow

Light and shadow belong together.

Yet the increasing number of artificial light sources on earth are resulting in continuously decreasing zones of shadow and darkness.

In architecture, the growing use of glass and other translucent layers questions the very significance of shadows.

Do they protect against or cause a loss of brightness?

Do we even need shadows today at all?
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Shadows are full of Secrets

The table cast a shadow on the grass.

Why do we say the table cast a shadow on the grass, and not the grass cast a shadow on the table?

Shadows are full of Secrets

A shadow is the absence of light.

...a negative entity, an absence, a hole in the light, there is nothing within the shadow to give it direction.
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We say.. “the beams run from wall to wall”..

... even though the beams do not move.

We say we can “see the sea”

... even if it is the light from the sea that moves towards us and there are no rays of vision... just as there are not shadow rays.
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Shadow Terminology

- Shading
- Attached Shadow
- Inter-reflection
- Cast Shadow
- Penumbra

Highlight

Refracted Shadow

Refracted Light

Cast Shadow

Penumbra
Shade and Shadow

Shadow Terminology

- Shading
- Shading
- Highlight

Light Direction

Light travels in a straight line... radiates out from the source
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Light Direction of Clear Lamps

Light travels in a straight line...radiates out from the source

.... add a clear enclosure or envelope around the source, the light will still travel in a straight line.

Light Direction of Frosted Lamps

Light travels in a straight line...radiates out from the source

.... add a coated or frosted enclosure or envelope around the source, the direction of light will bend and radiate from the surface of the enclosure.
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Penumbra

Small light source

Large light source

Penumbra
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Colored Shadows
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The Allegory of the Cave

• Plato realizes that the general run of humankind can think, and speak, etc., without (so far as they acknowledge) any awareness of his realm of Forms.
• The allegory of the cave is supposed to explain this.
• In the allegory, Plato shows people entrenched in the Theory of Forms to prisoners chained in a cave, unable to turn their heads. All they can see is the wall of the cave. Behind them are a fire and puppeteers, who sit facing the fire and puppeteer puppets in a framework, from which puppets cast shadows. The puppeteers, who are behind the prisoners, hold up puppets that cast shadows on the wall of the cave. The prisoners are able to see these puppets, the real objects, but not behind them. What the prisoners see and hear are shadows and echoes cast by objects that they do not see.
• The prisoners may learn what a book is by their experience with shadows of books. But they would be mistaken if they thought that the word "book" refers to something that any of them has ever seen. Likewise, we may acquire concepts by our perceptual experience of physical objects. But we would be mistaken if we thought that the concepts that we grasp were on the same level as the things we perceive.

Shadows in Science
Shade and Shadow

**Shadow Recognition (identification)**

We see a shadow, then activate a recognition process that triggers the category of the object.
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Shadows and Distance

These two round images are simply flipped copies of each other. The reason they look different is that your visual system is inclined to interpret images as having a light source coming from above - the shadows from such a light source are only consistent with a dent (left) and bump (right).

You can use a shadow to disambiguate an image. Are these steps ascending or descending? Do you see them from top or bottom of the stair?

Shadows Define or Confuse

Shadows and shading are used in perception in order to reconstruct object’s shape and relative position. However this ability may conflict with other visual capabilities and be overrun by them.
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**Shadows Proofs**

Typically shadows hide. But, a shadows can also reveal. In this case, the round shadow cast from some object out of view can sharpen the contrast of the small shadow, and make it more visible.

**Losing Shadows**

The image of a face is seen on the left – shadows reveal the contour, but, outline the shadow, and the effect is lost. The outlining turns the shadow into a non-shadow, and prevents vision from using it to reconstruct the 3-D structure of object.
Shade and Shadow

Shadows Define or Confuse

Our visual system can assign different interpretations to areas in the image that have the same content.

*Lightness* is the perceived reflectance of a surface. It represents the visual system’s attempt to extract reflectance based on the luminances in the scene.

*Brightness* is the perceived intensity of light coming from the image itself, rather than any property of the portrayed scene. Brightness is sometimes defined as perceived luminance.

Shadows Define or Confuse

The impossible steps. On the left, the horizontal strips appear to be due to paint; on the right, they appear to be due to shading.

The importance of scene interpretation... one sees two different or identical objects?

Click for Demo  Click for Demo  Click for Demo
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Famous Shadows

[Image of a shadow person leaning against a wall]

Famous Shadows

[Image of a child standing in front of a large shadow]

16
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Famous Shadows

Famous Shadows
Shade and Shadow

Larry Kagan

For light lends a building its contour....

..and shadow lends it depth.
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Tandao Ando

Forest of Tombs Museum

Church of the light
Shade and Shadow

Tandao Ando

Hyogo Prefectural Museum

Church On The Water

Tandao Ando

Church On The Water
Shade and Shadow

Tandao Ando Links

http://www.pulitzerarts.org/ando.htm

http://www.coldbacon.com/art/tadaoando.html

Luis Barragán
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Louis Kahn

Louis Kahn
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Le Corbusier

Le Corbusier
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**Steven Holl**  
Loisium Visitor Center

**Herzog and de Meuron**  
Walker Art Center
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Etchings and Sketchs

Giorgio de Chrico's

Mystery and Melancholy of a Street
The Disquieting Muses
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Photographs

www.shadowspro.com
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Building a Model

Tip 1

Do not use Foam Core – the material glows and creates light leaks
Use black paper on white board and cover or tape all light leaks
Black Foam Core is expensive.
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**Tip 2**

White Foam Core is reflective and shiny. Cover the insides with appropriate surface reflectance or color material.

**Tip 3**

Make a modular model with interchangeable parts.
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**Tip 4**

Mirrors can enhance the depth of a model.
Mirrors are useful in large space with respective plans.

**Tip 5**

Know true north and latitude.
Draw north arrow on your model.
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Tip 6

Include accessible large view ports.
Large enough for use cameras or yield a good view of the interior.

Tip 7

Include people or objects for scale.