



RULES FOR LIGHT LOGIC

(for objects illuminated by a single light source)

The artists who illustrated the illuminated manuscripts of the Middle Ages clearly had an understanding of the effects of different lighting conditions upon objects. However, the strict artistic and church codes of the day, with their insistence on the use of Byzantine perspective, make it difficult to determine how much of the lighting effects were understood by the artist or if they were simply routinely copied from prior examples. To our knowledge, the rules governing light's behaviour when falling upon a form were not written down or codified during the Middle Ages in any instructional treatise.

The great early Renaissance artists, operating in an environment of scientific curiosity and freedom, thoroughly studied the effects of light on different geometric objects. The rules of light and shade (or *chiaroscuro* in Italian) were written down and formally taught to students at Italy's first art academy founded in Florence by Lorenzo de Medici. Students at this academy were given a series of exercises which involved drawing cubes, cylinders and spheres illuminated by a single candle. Similar exercises were used in art schools until the early 1900's but slowly fell from fashion as modernism became more prevalent and cultural standards of visual literacy eroded. Today one can not assume that an art student has any knowledge of the laws of the light logic.

In the intervening 500 years, the term *chiaroscuro* has assumed a variety of different meanings. The Merriam-Webster dictionary currently defines *chiaroscuro* as follows:

- pictorial representation in terms of light and shade without regard to colour
- the arrangement or treatment of light and dark parts in a pictorial work of art
- the interplay or contrast of dissimilar qualities (as of mood or character)
- a 16th century woodcut technique involving the use of several blocks to print different tones of the same colour; also, a print made by this technique
- the interplay of light and shadow on or as if on a surface
- the quality of being veiled or partly in shadow

Nature uses light to reveal the geometry of an object in 2 ways:

1. By the way light falls over the form and changes the amounts of light and darkness (known as *value*) of the different parts of the object
2. By the hardness and/or softness of the edges of the shadows

If we wish to faithfully and realistically reproduce the image of an object we must understand and properly replicate these changes in our image by properly using the *Rules of Light Logic*.



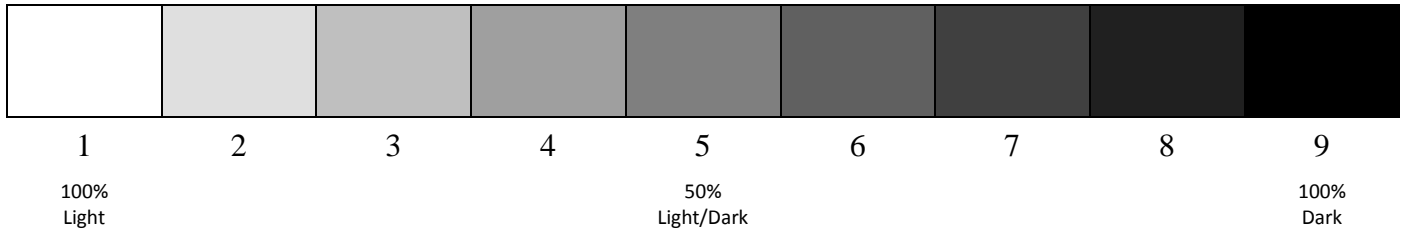
THE 9 – POINT VALUE SCALE

We will utilize a 9 point value scale. This allows for a true middle tone.

The segmenting of the scale into 9 increments is practical because more than that seems cumbersome and less is not enough.

Richard Schmid - Alla Prima

In this scale 1 is white and 9 is black. Please note that the scale below is a rough guide.



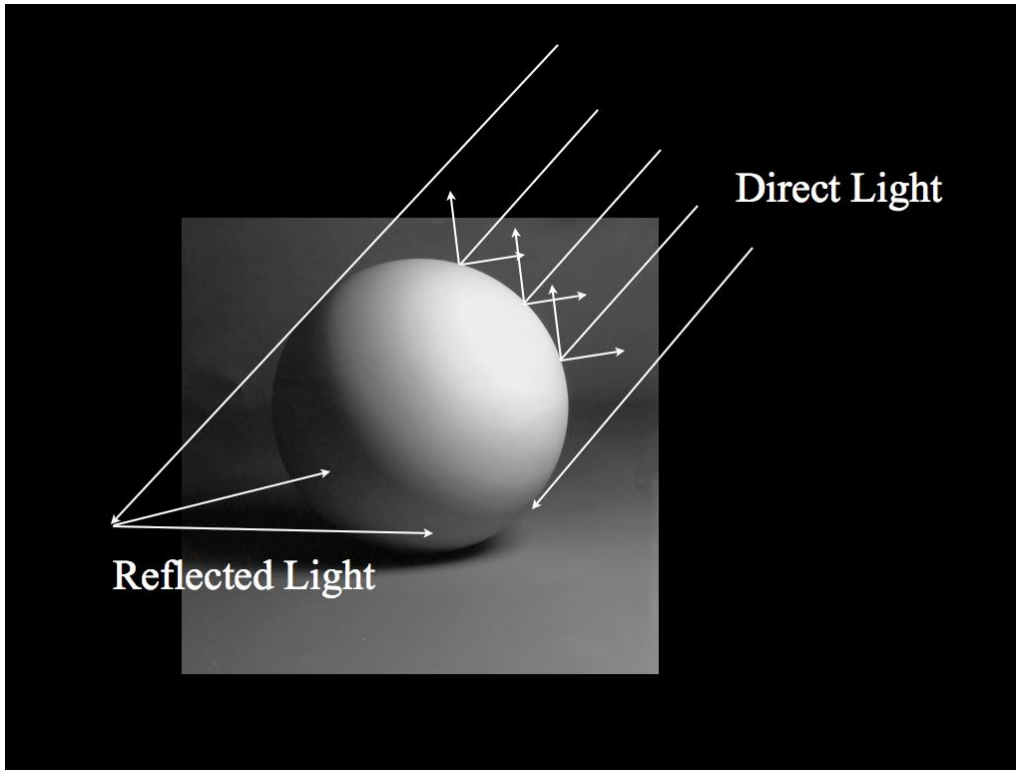
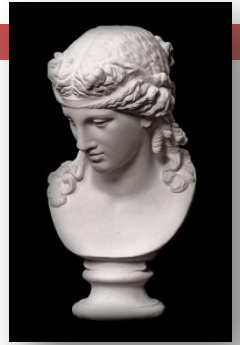
LIGHT LOGIC

The simple/basic forms are spheres, cubes, and cylinders. The artist reduces all natural forms into these components or parts of them.

In nature, the artist will find that there are two common lighting effects; crest lit and rim lit situations. Crest lit is the lighting configuration when the lightest light is found somewhere within the form. The light, medium, and dark half-tones turn away from the lightest light in all directions. Rim-lit is the lighting configuration where the lightest light is found on one or the other side of the form. The light, medium, and dark half-tones turn away from the lightest light in one direction - away from it.

In order to discuss the rules of light logic, we need to have a common vocabulary to refer to the different parts of the light and shadow portions of an object. We will adopt the following conventions and common terminology.





Bed Bug Line

Cast Shadow

Bed Bug Line

1. This is the brightest spot where the light hits perpendicular to the surface.
2. Crest or Rim Lit Situation - the lightest area surrounding the highlight
3. Light half tone - local value - the normal value of object
4. Light/Medium half tone
5. Medium half tone
6. Dark half tone
7. Reflected light - light that is reflected from a surface to the form
8. Bedbug line - the edge where light and dark meet - where the light falls off the form
9. Cast shadow - a shadow cast on a surface from the form



1	Lightest Light	<i>Lights</i>
2		
3	Medium Light	
4		
5	Darkest Light	
6		
7	Light Dark	<i>Darks</i>
8	Medium Dark	
9	Darkest Dark	

THE SILHOUETTE - THE DIVISION OF LIGHT AND DARK (SHADOW)

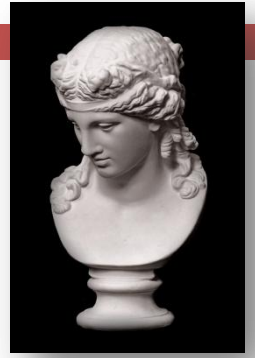
The massing-in of the dark (shadow/negative) giving the artist a light (positive) is fundamentally the most important statement made in representational drawing and painting. The artist achieves the likeness of their subject in a flat statement. This will have a ‘graphic’ appearance. The bedbug line (shadow or terminator line) is the edge that tells the artist when the direct light has fallen off the form. More importantly, the bed-bug line weaves over every surface change on an object. In short, the job of the bed-bug line is to describe the form.

THE CONTAINED SHADOW

The artist will observe that there are 2 types of shadow; the form shadow (contained shadow) and cast shadow. The contained shadow is the shadow pattern found within the form. The cast shadow is the shadow thrown by the form. All shadows tend to read darkest at their edges. The contained and cast shadows can be broken down into light-darks, medium-darks, and darkest-darks. The lighter values found in the contained shadows are referred to as the reflected lights. Reflected light is the light that has travelled past the form and has reflected into the shadow. This phenomenon only occurs in the shadow family. How light or dark in value reflected light reads is dependent on how far the reflected light has had to travel. The greater that distance of travel the darker the value. The shorter the distance of travel the lighter the value. The value of the bed-bug line will register lighter or darker depending on how fast or how slow the direct light falls off the form. The faster the direct light falls off the form - the darker the value. This results in a harder edge of the value shape. The slower the direct the light falls off the form – the lighter the value. This results in a softer edge to the value shape. In other words, the squarer or sharper the form, the darker and harder the edge. The rounder or more blunt the form is, the softer and lighter the edge. This is dictated by the planes or facets of the form and direction of the light.

THE CAST SHADOW (THROWN)

The cast shadow does not have an even value throughout. The cast shadow edges are harder and darker as they approach the form, and get softer and lighter as they move further away from the form. The interior of the cast shadow is illuminated by indirect light. The values within the cast shadow will darken closest to the form and will get lighter away from the form. The penumbra is the partially shaded outer region of the cast shadow. Its length gets longer and shorter as it moves toward and away from the form respectively.



THE LIGHT - THE AREA OF THE FORM ILLUMINATED BY DIRECT LIGHT.

In the lights we will find; light-lights, medium-lights, and dark-lights. The lightest light is commonly the highlight. The medium-lights and dark-lights are determined by the surface of the form falling away from the direct light. The change in direction of the facets or planes of the surface cause a change in value. The hardness or softness of the edges of these values is again determined by how fast the form falls away from the light. The squarer or sharper the planes are, the harder the edges. The softer or rounder the planes, the softer the edges. The planes facing the direct light are lighter. The planes turning away from the direct light are darker. Darker halftones are commonly found closest to the bed-bug line. In essence, the artist must feel with their eyes how the light caresses the form. This feeling is duplicated in the rendering of the forms.

One should render the largest forms first - big form modeling. And then, in order of decreasing size, smaller forms. In simple terms, the objective of the half-tones is to wrap or veil the form.

RULES

1. The light and the dark **must** be separated - the silhouette (the likeness).
2. The bed-bug line **must** describe the form.
3. The darkest light **must** be lighter than the lightest dark. Conversely, the lightest dark **must** be darker than the darkest light.
4. All shadows **must** be darker at the edges.
5. Shadow edges on the form **must** be hard or soft depending on how fast the form curves from the light. Values along the edge **must** change - darker if harder edged and lighter if softer edged.
6. Half-tones **must** wrap or veil the form.