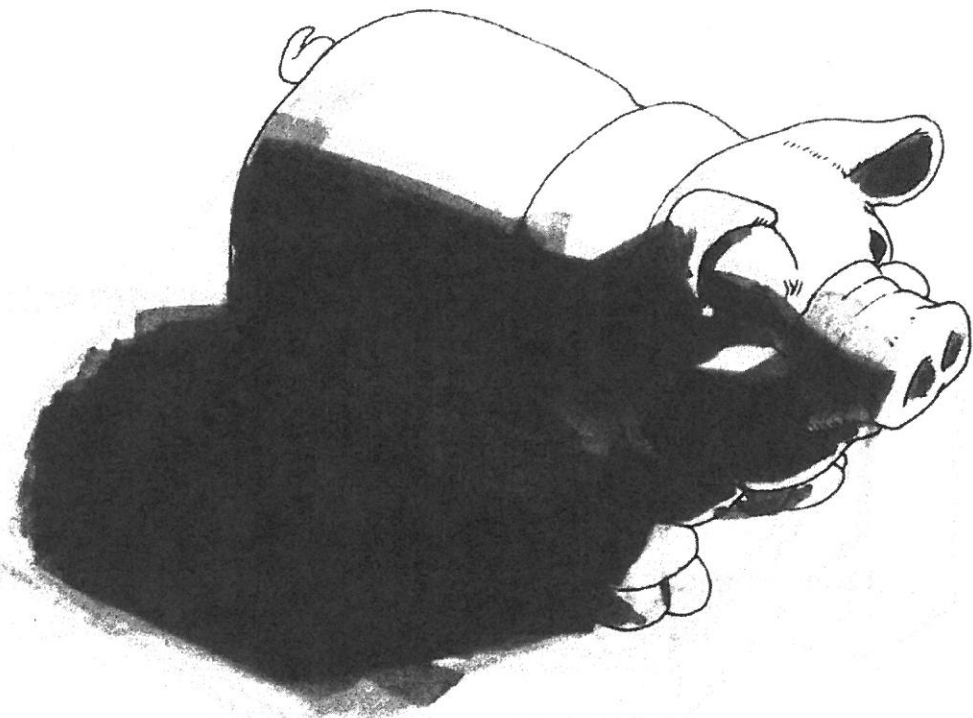


Chapter 2: Isometric Light & Shadow



The world in parallel dimensions, illuminated...

Isometric Light & Shadow

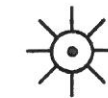
Calculating cast shadows in perspective is one of the most rewarding drawing skills you can have. At first glance the theory may seem complicated, but it is in fact quite simple. This chapter covers the two basic types of light sources, local light (like a lamp on a desk, or street light) and sunlight. There are only two principles you will need to understand in order to calculate cast shadows like a pro.

1. Angle of light from the light source to the top of the object casting the shadow
2. Direction of light from the plan of the light to the base of the object casting the shadow.

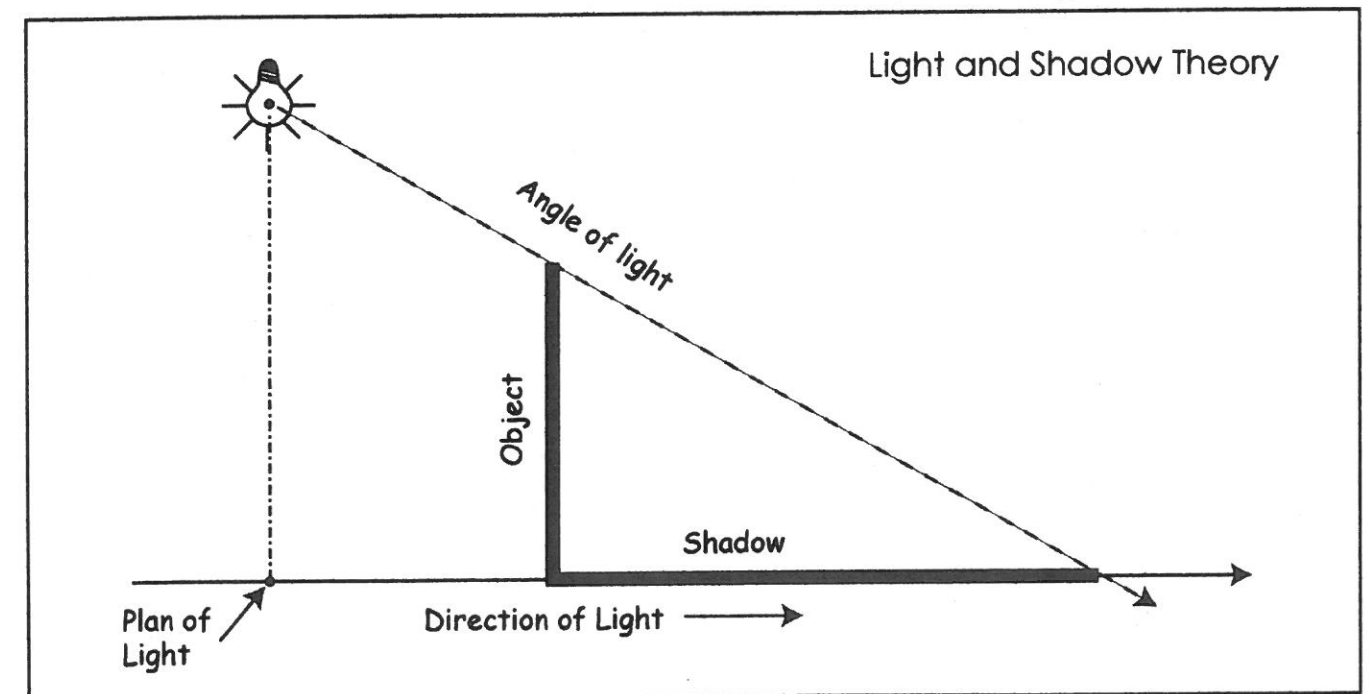
The plan of the light is the spot on the ground that the light source is over. "Ground" is whatever plane the cast shadow is falling on.



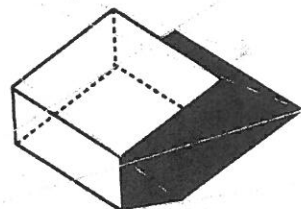
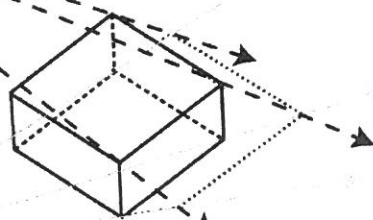
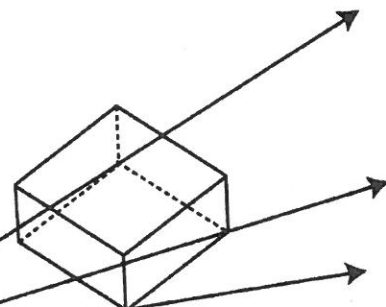
Local light



Sunlight



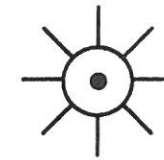
Isometric Local Light



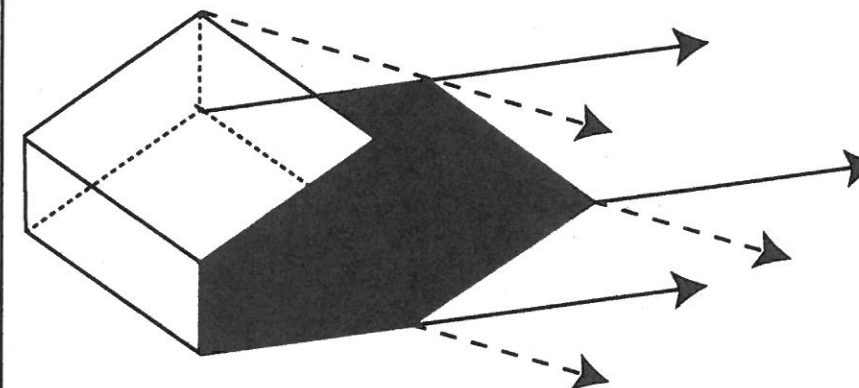
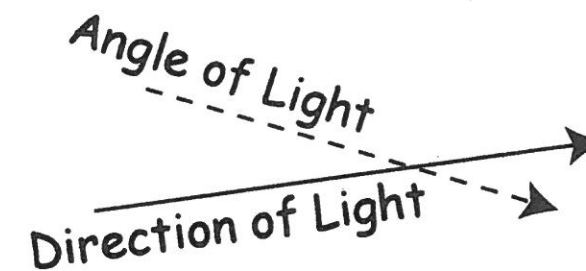
Local Light

- (1) Prepare a finished Isometric line drawing.
- (2) Determine the Plan of the light, and the location of the light source.
- (3) Apply the Direction of light from the Plan of the light, and Angle of light from the light source on every vertical line. Simplify complex shapes to a stick, plane, box, cylinder, pyramid or cone.
- (5) Apply the Direction of light on all vertical planes, and the Angle of light on every line that is perpendicular to the side plane.
- (6) Block both form and cast shadow with the same value. Form shadow starts where the light turns to shadow on the object itself, and finishes where it turns or faces back to the light again.
- (7) Apply Atmospheric perspective (darker shadows closer to the viewer, lighter/less contrast farther away).

Isometric Sun Light



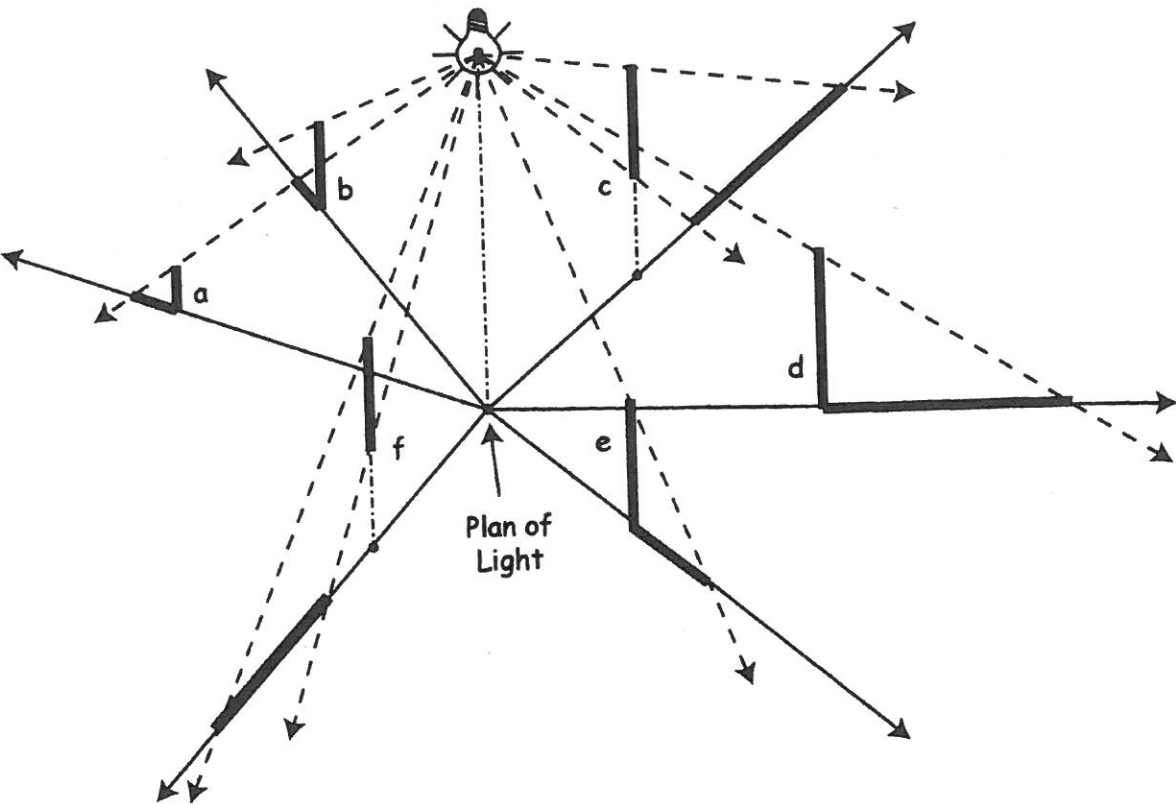
Angle and direction of Light are Constant



Sunlight

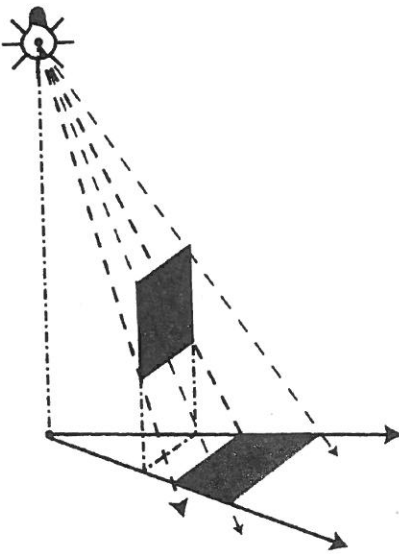
- (1) Prepare a finished Isometric line drawing.
- (2) Determine the Direction of the Sunlight and the Angle of Sunlight, this is up to you, but once you establish it, the angle and direction must remain constant.
- (3) You may need to figure out the Direction of Sunlight on the vertical plane using an Isometric box.
- (4) Apply the Direction of Sunlight and Angle of Sunlight on every vertical line. Simplify complex shapes to a stick, plane, box, cylinder, pyramid or cone.
- (5) Apply the Direction of Sunlight on all vertical planes, and the Angle of Sunlight on every line that is perpendicular to the side plane.
- (6) Block both form and cast shadow with the same value. Form shadow starts where the light turns to shadow on the object itself, and finishes where it turns or faces back to the light again.
- (7) Apply Atmospheric perspective (darker shadows closer to the viewer, lighter/less contrast farther away).

Isometric Light and Shadow
Objects not touching ground plane

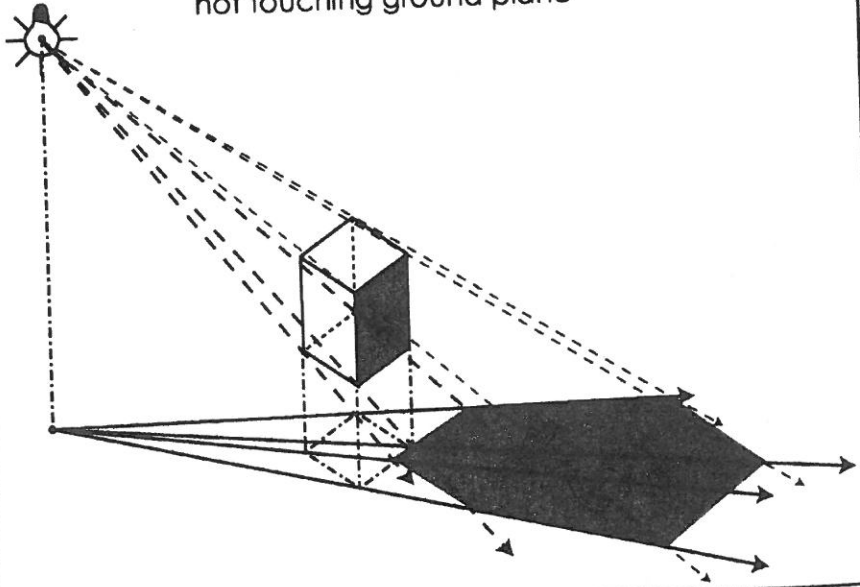


Objects (c) and (f) are not touching the ground plane.

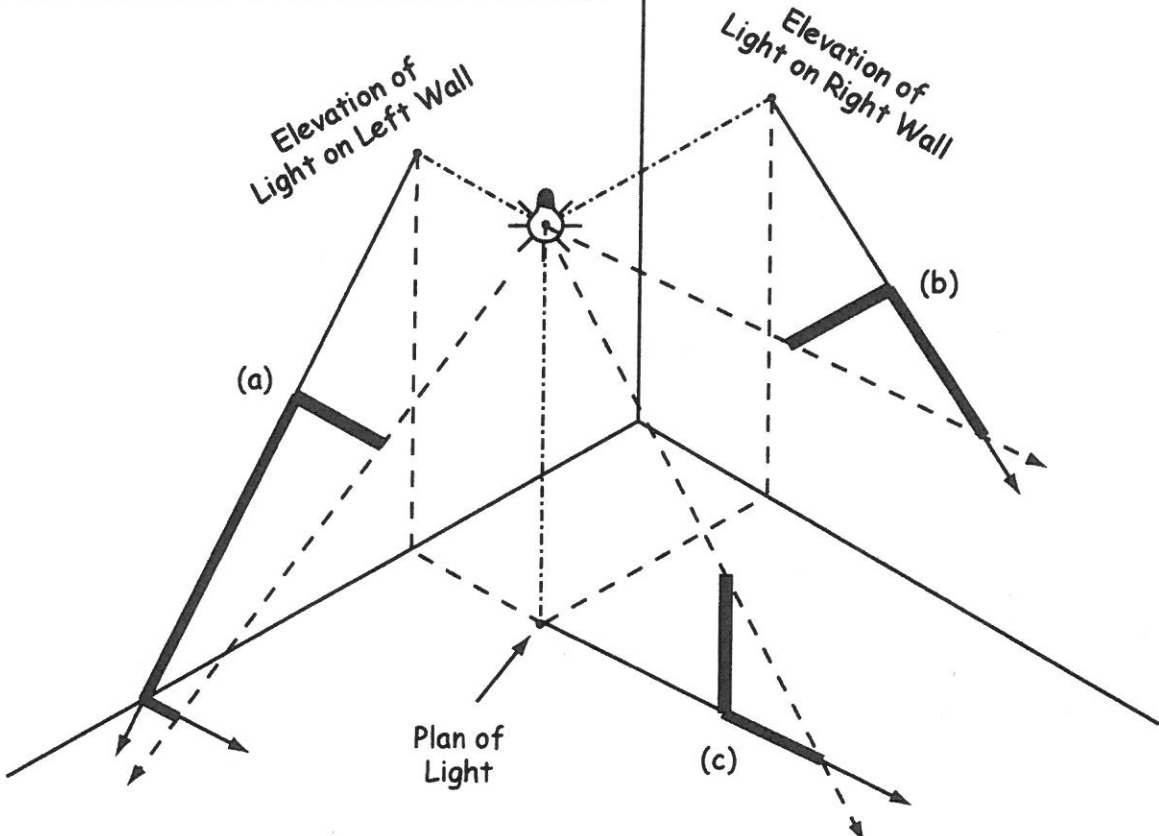
Projecting Shadow of a Plane
not touching ground plane



Projecting Shadow of a Box
not touching ground plane

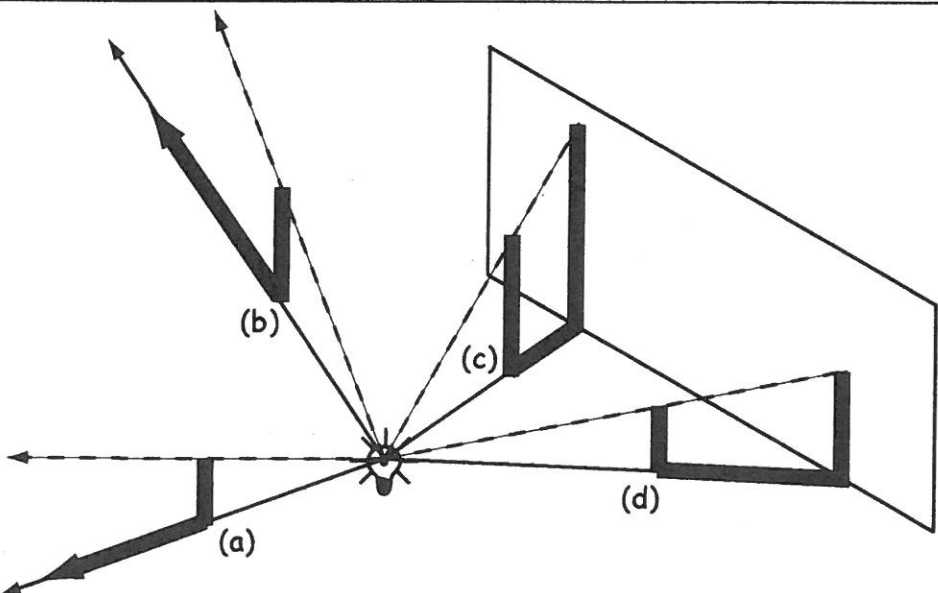


Cast Shadow on Different Planes



Object (a) is Perpendicular to the Left Wall. Object (b) is Perpendicular to the Right Wall
Object (c) is Perpendicular to the Ground Plane

Local Light on
Ground Plane



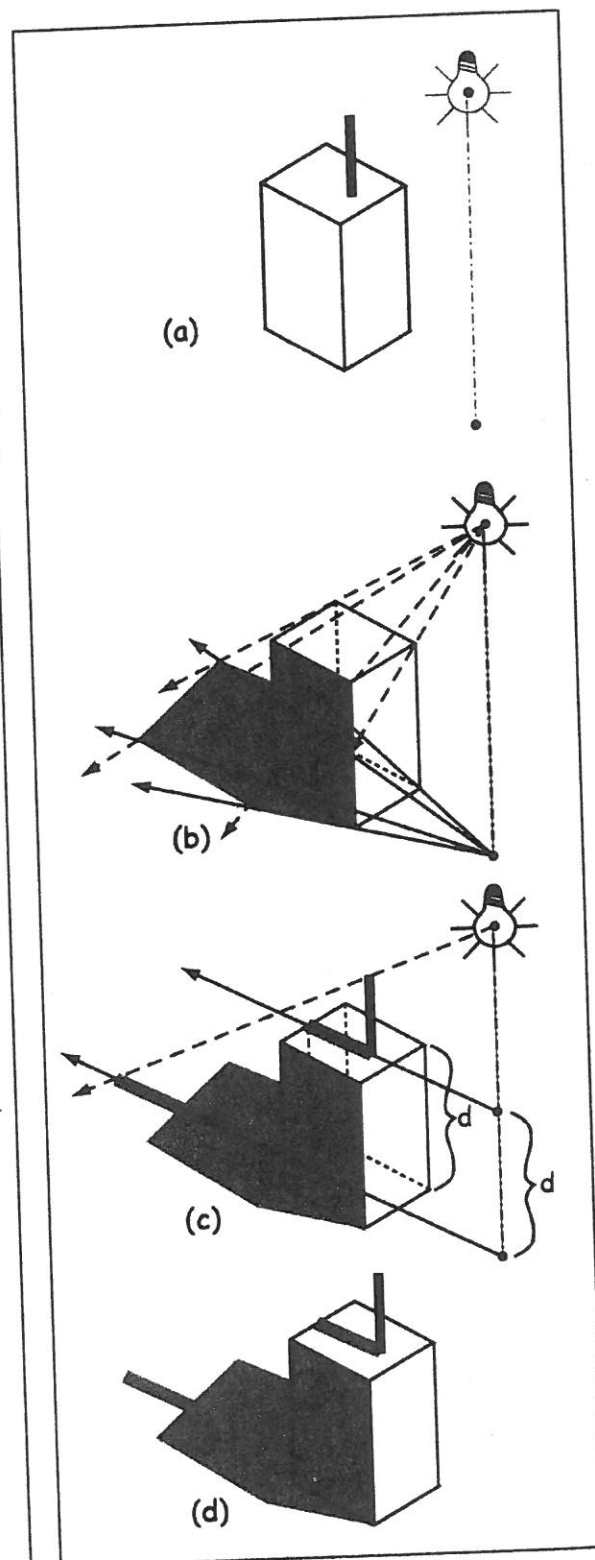
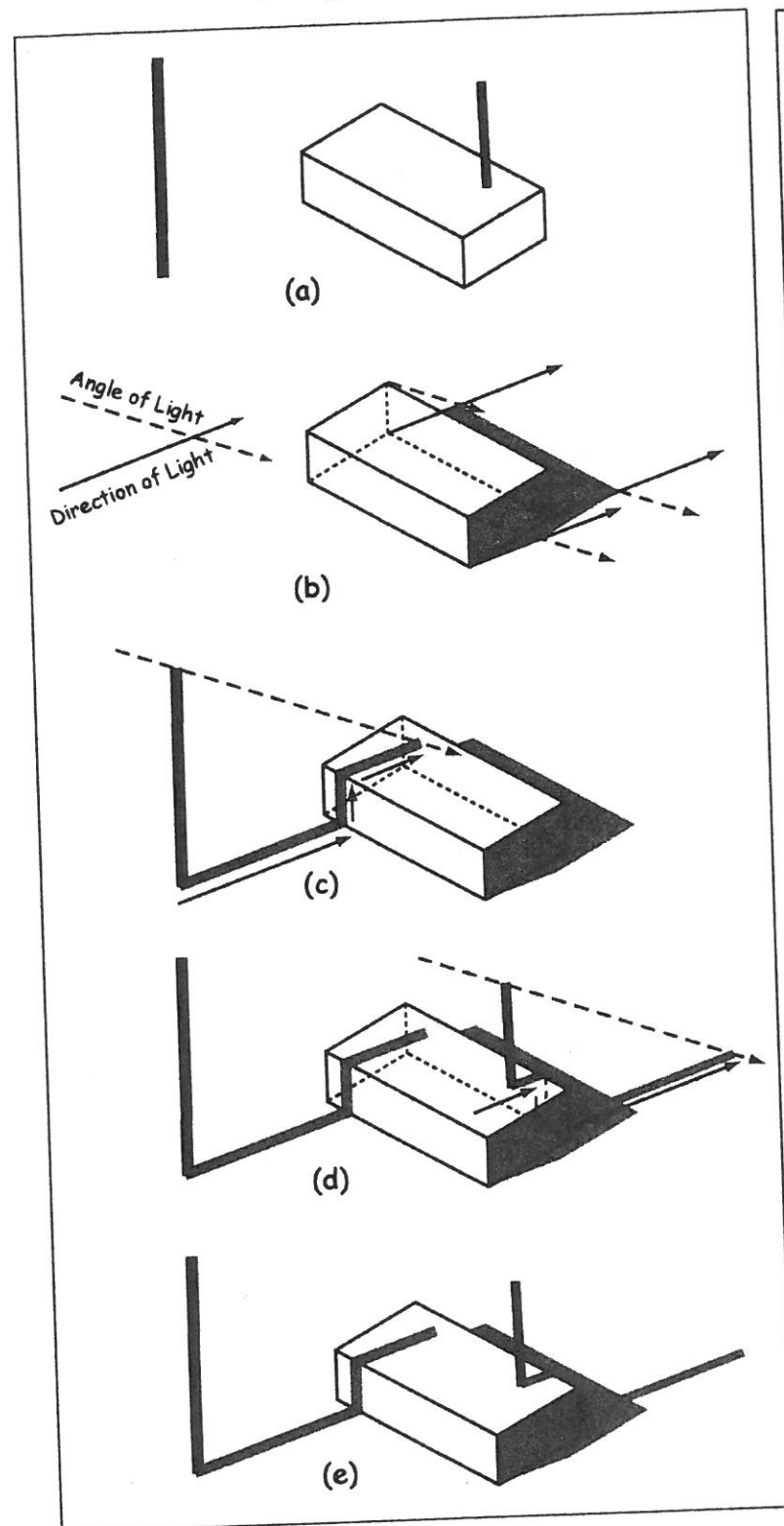
The Plan of the Light and the Light are in the same place on the Ground Plane.
The shadow of objects (a) and (b) go on forever, (c) and (d) intersect with wall and follow it's contour.

Chapter 2

Cast Shadow on Different Planes Which are Parallel to Ground Plane

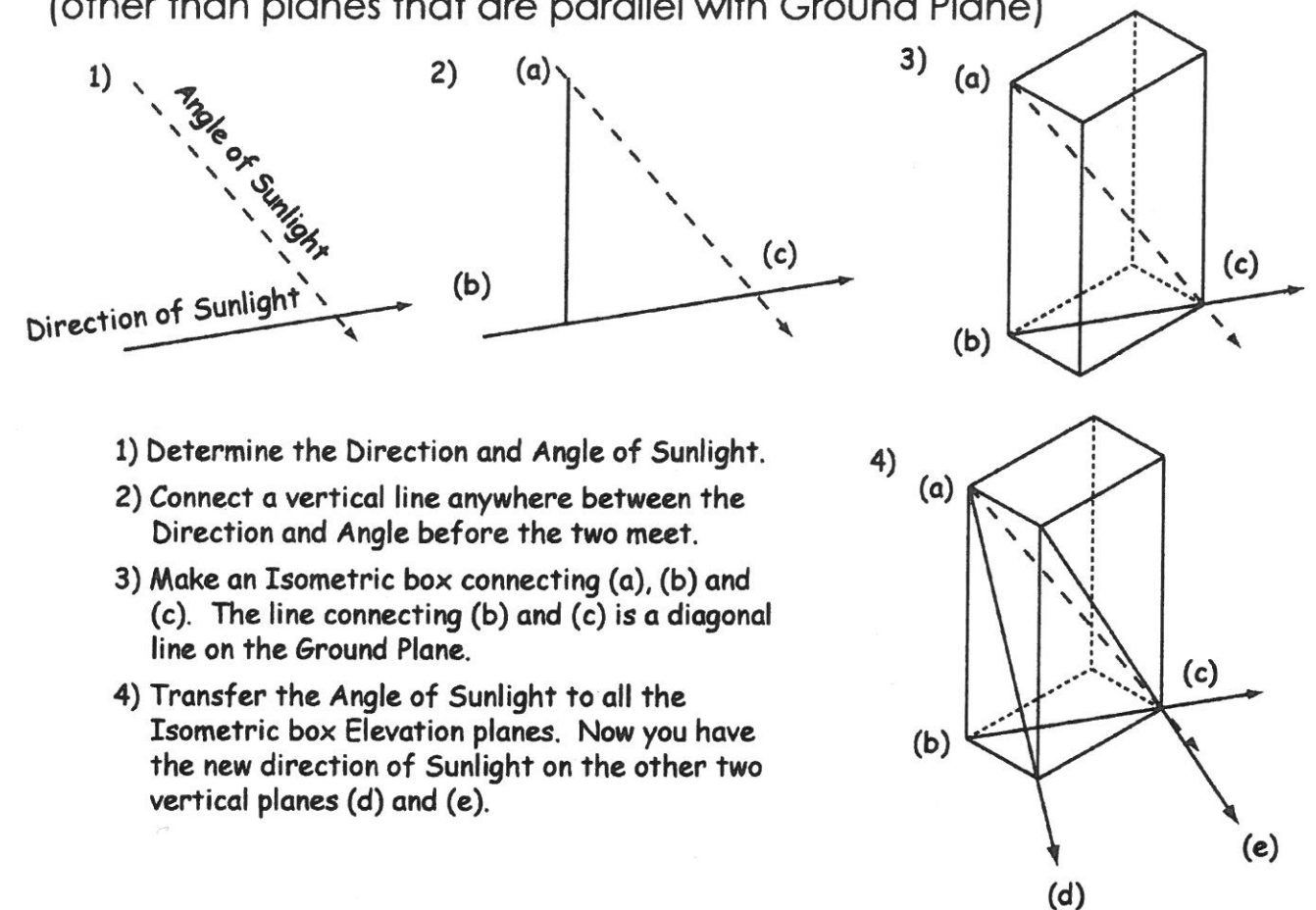
Sunlight

Local Light



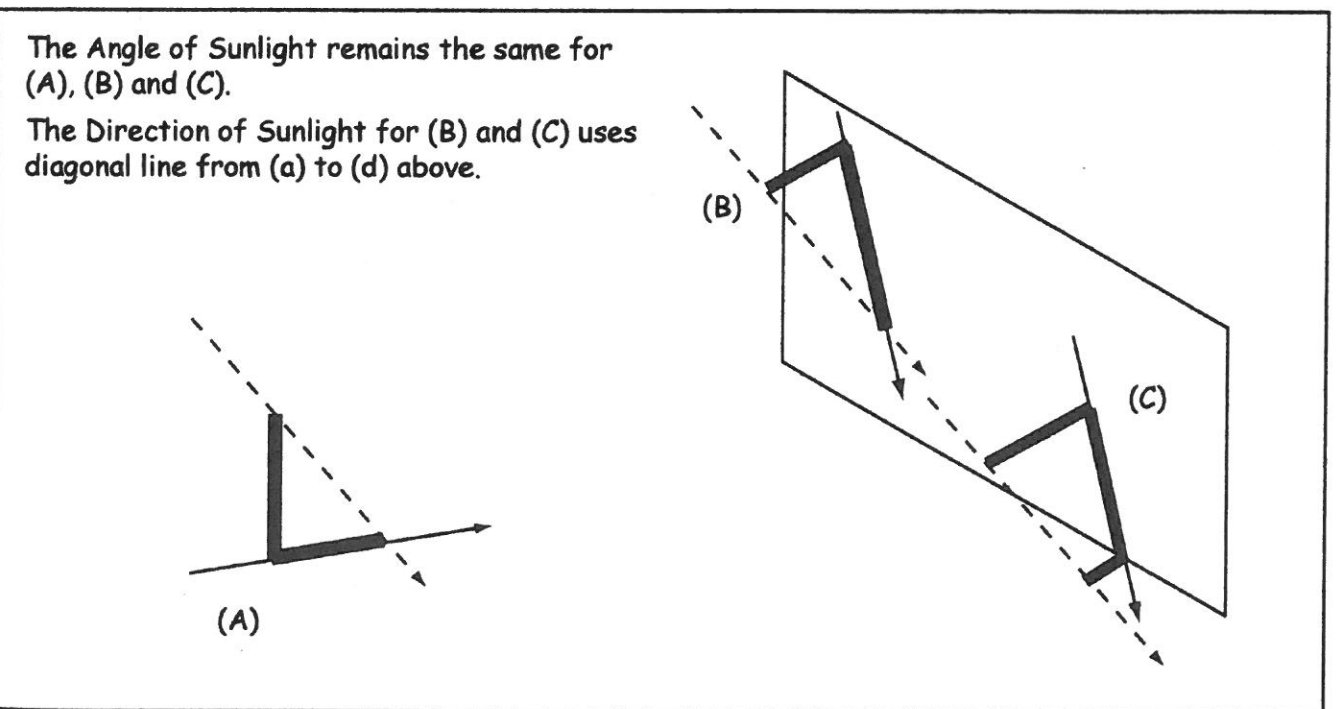
Isometric Light & Shadow

Sunlight Cast Shadows on Different Planes (other than planes that are parallel with Ground Plane)

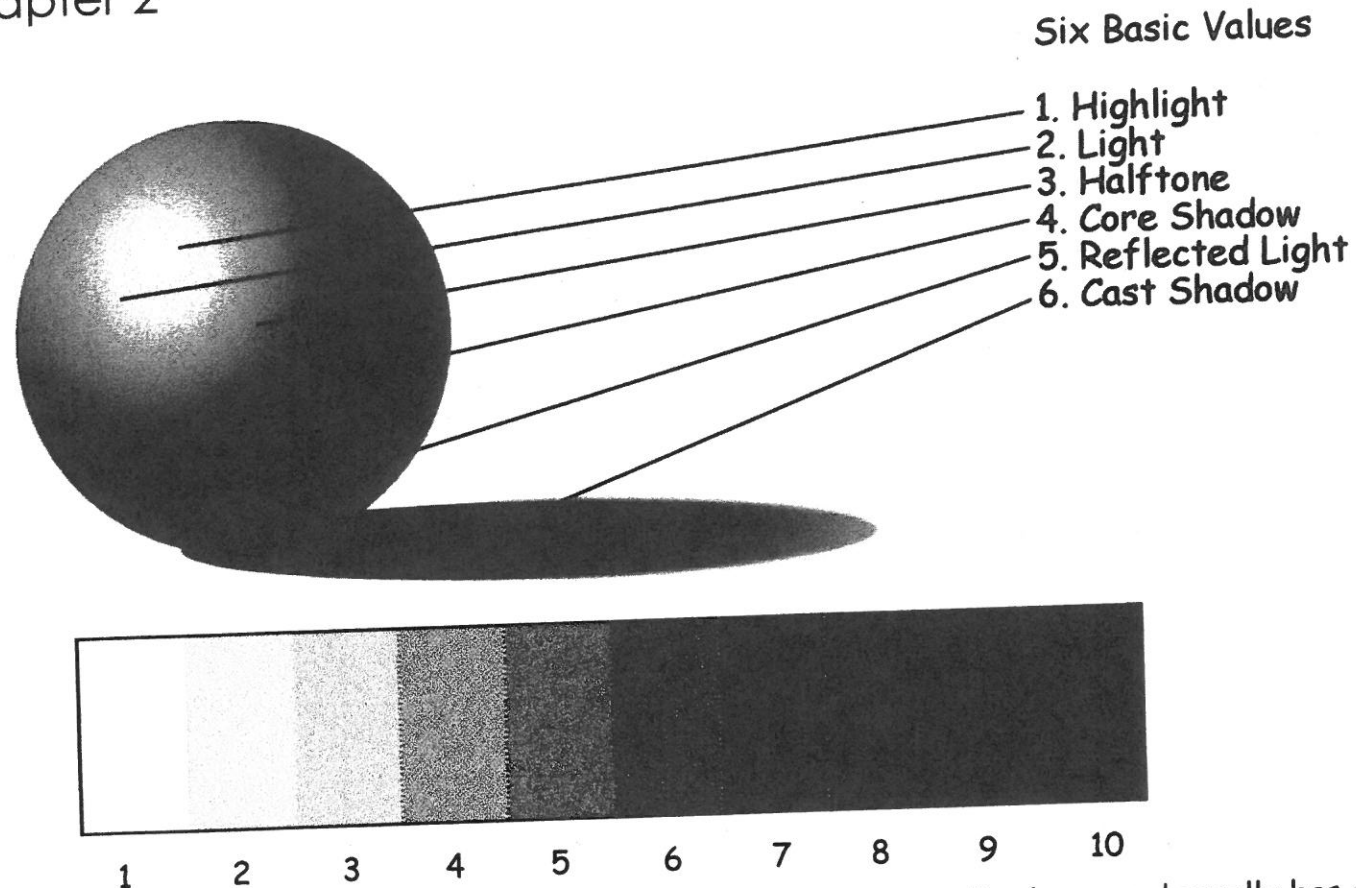


- 1) Determine the Direction and Angle of Sunlight.
- 2) Connect a vertical line anywhere between the Direction and Angle before the two meet.
- 3) Make an Isometric box connecting (a), (b) and (c). The line connecting (b) and (c) is a diagonal line on the Ground Plane.
- 4) Transfer the Angle of Sunlight to all the Isometric box Elevation planes. Now you have the new direction of Sunlight on the other two vertical planes (d) and (e).

The Angle of Sunlight remains the same for (A), (B) and (C).
The Direction of Sunlight for (B) and (C) uses diagonal line from (a) to (d) above.



Chapter 2



Six Basic Values

Imagine that all values are simplified onto a scale from 1 to 10. 1 being pure white, 5 being middle gray and 10 being pure black. This is only a hypothetical framework to assist you in better rendering the light and shadow in your drawing. Every lighting situation is different, but in general the six basic values fall on this scale as follows:

1. Highlight= 1
2. Light= 2-3
3. Halftone= 4-6
4. Core shadow= 9-10
5. Reflected light= 6-8
6. Cast shadow= 9-10 nearest the object, fading to 7-8 or lighter.

Furthermore the values have an edge quality, which is a relationship of soft (blurry) to sharp (crisp). In general the 6 basic values have these edge qualities:

Six Basic Values

1. Highlight
2. Light
3. Halftone
4. Core Shadow
5. Reflected Light
6. Cast Shadow

Highlight is generally sharp, and usually has a tail or an edge that is softer.

Light, halftone, core shadow and reflected light usually have a soft, seamless gradation from light to dark.

Cast shadow is sharp, particularly near the object casting the shadow and tends to get softer and lighter as it moves away from the object. It is this contrast of soft core shadow (often referred to as form shadow, because it creates the illusion of form) and hard cast shadow that most gives a drawing three-dimensional solidity.

Local Tone

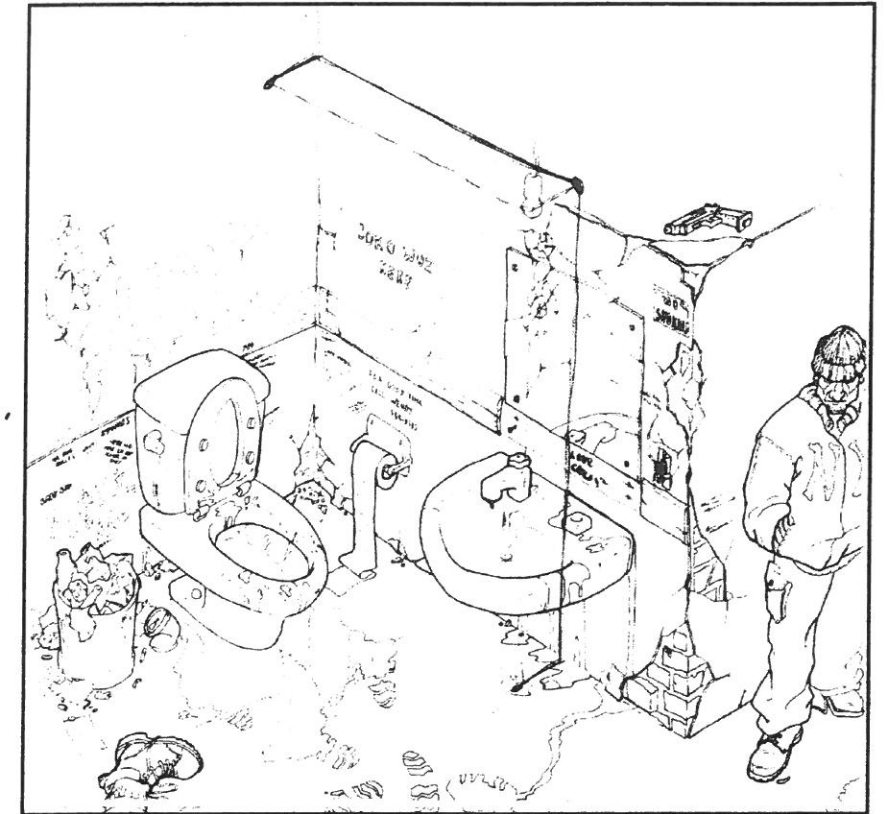
The local tone of an object is its actual value, for example a white sheet of paper has a local tone of value 1 or 2, while a black cloth might have a local tone of value 9 or 10. The local tone can have an effect on all of the Six Basic Values described above, making them overall darker or lighter.

Isometric Light & Shadow

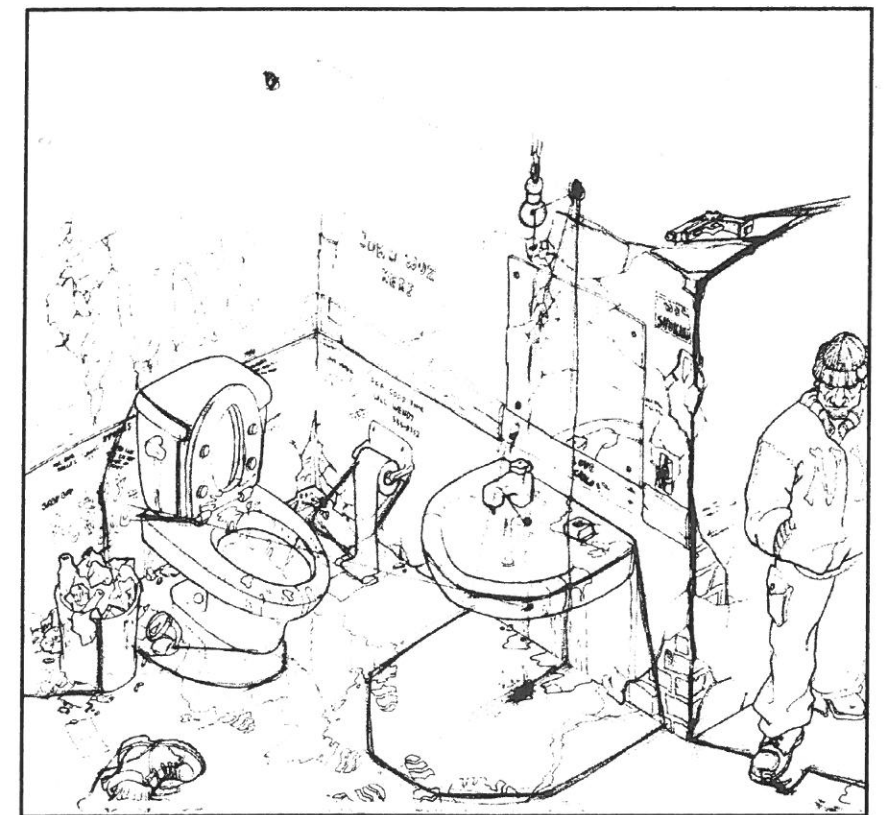
Prepare a finished Isometric drawing.

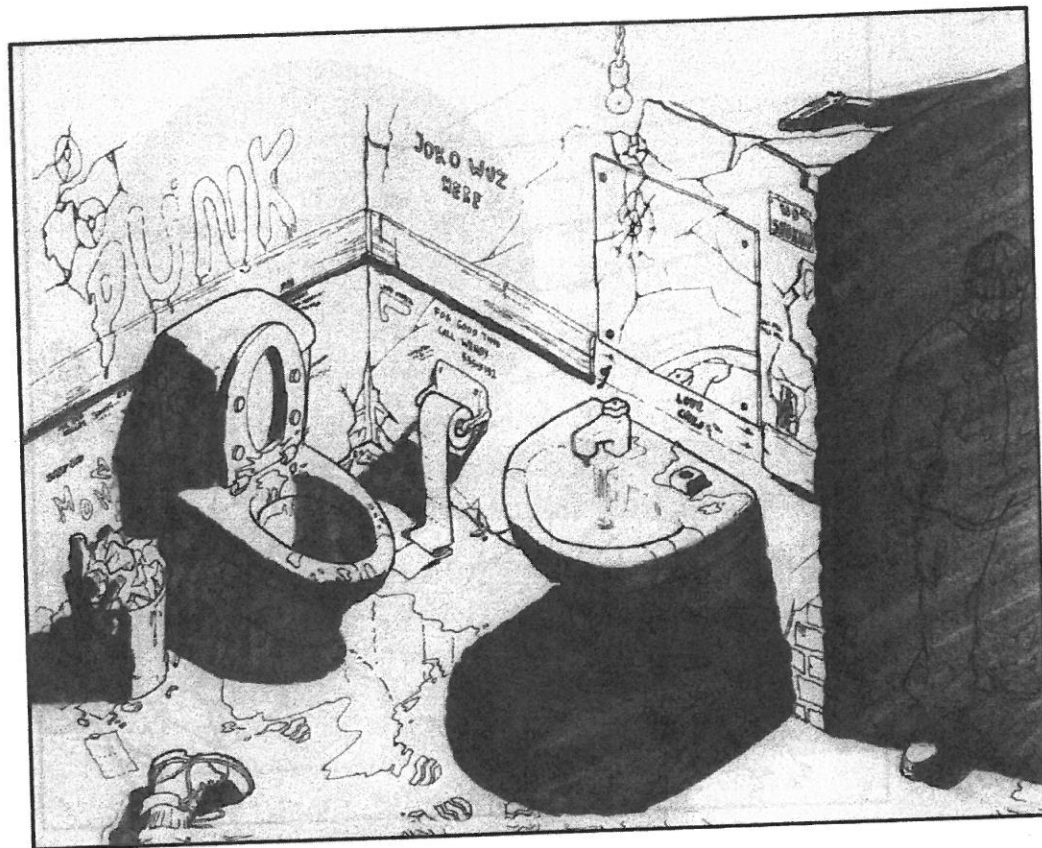
Determine the plan of the light and the location of the light source.

See "cast shadow on different planes" and determine the elevation of light on the right wall, and the elevation of light on the left wall.

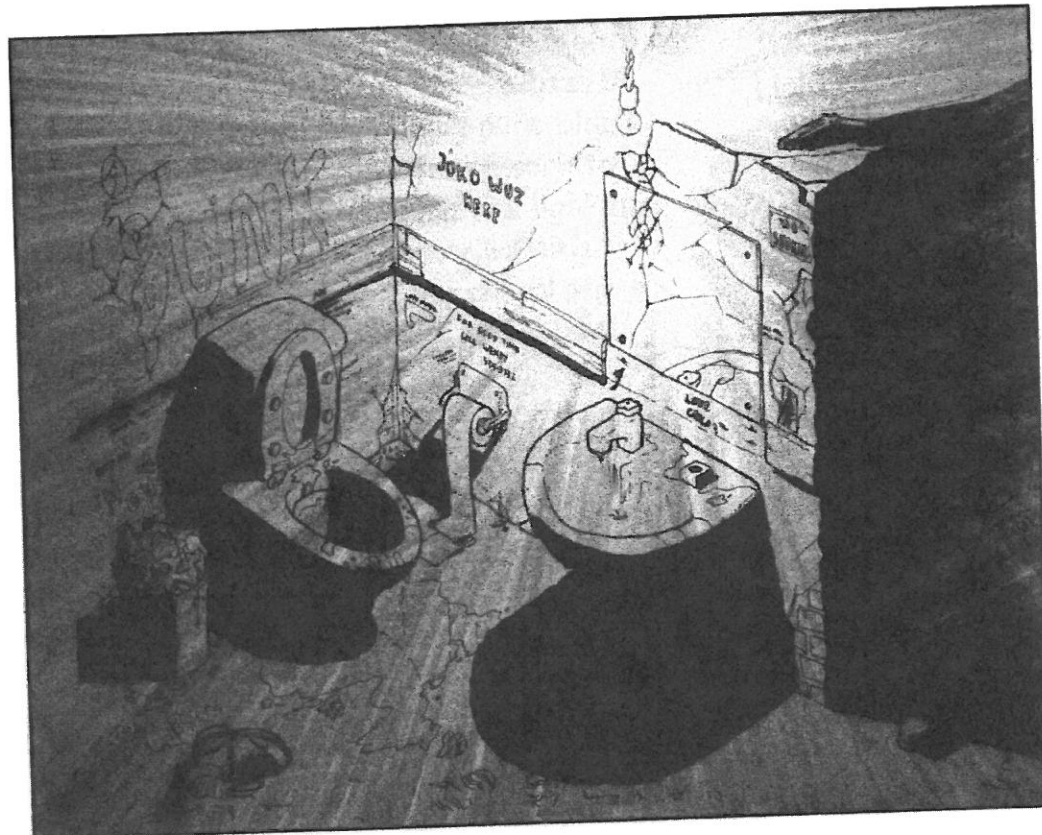


See "cast shadow on different planes" to calculate the form and cast shadows.

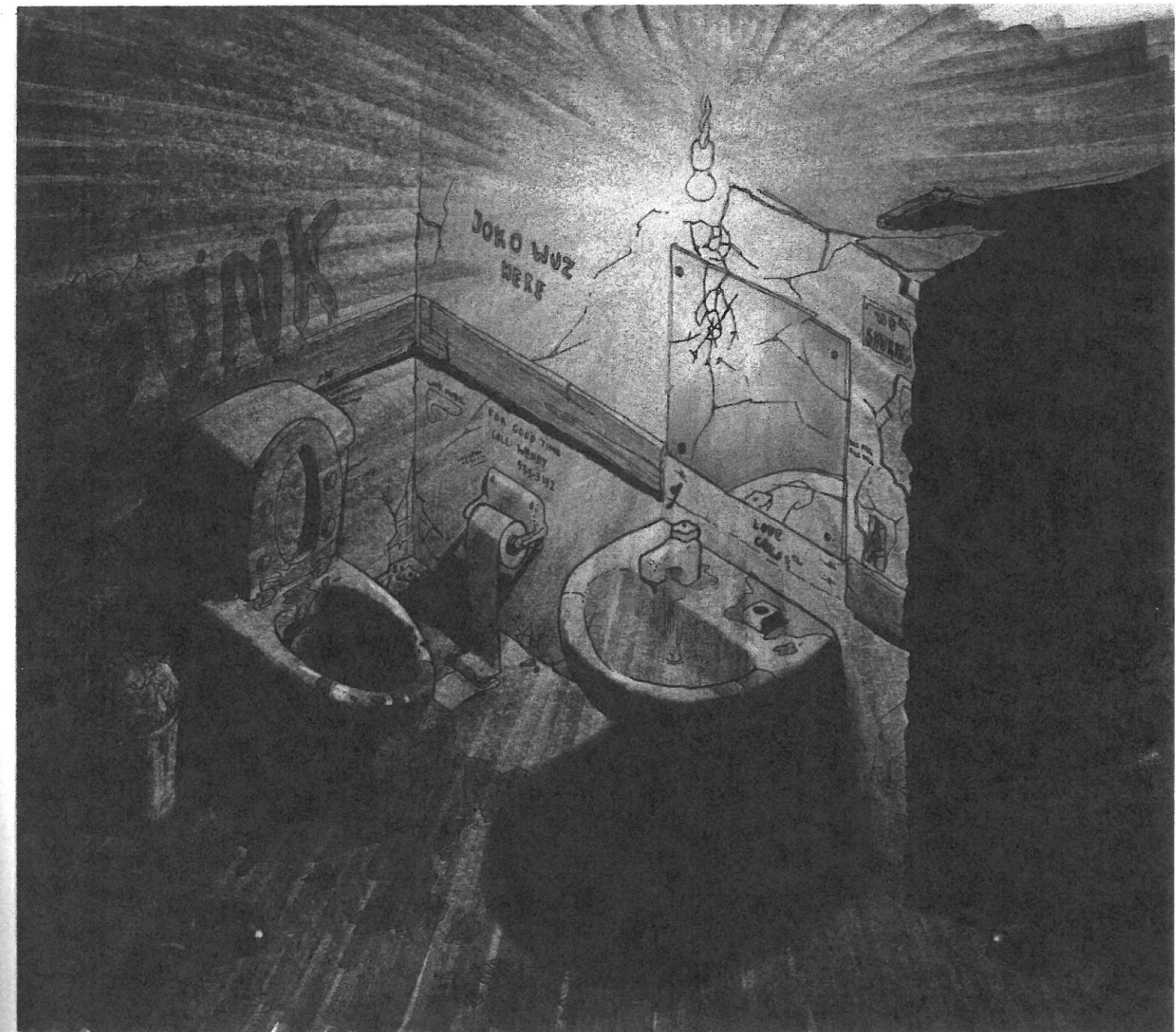




Block the cast shadows and the form shadows with one value. The point here is too simplify. Use a dark value (7 or darker on the value scale).

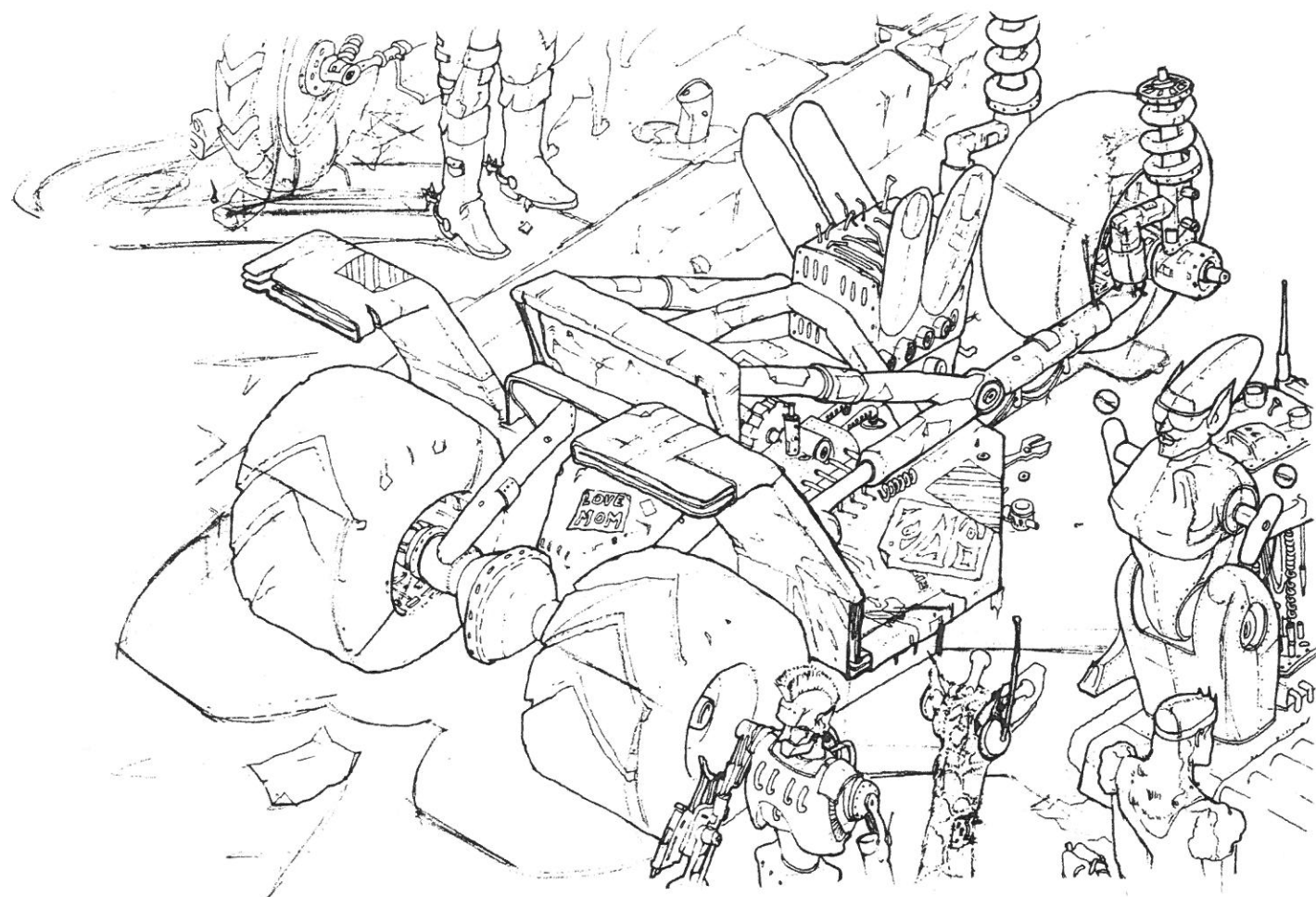


Apply value changes (gradation) from the light source out. Don't lose your separation of dark and light. The values in the light range from 1 to 5, while those in the shadow range from 6 to 10.



Apply soft edges, core shadows, darker cast shadows, local tones and high lights to the work.

See if you can find the shadow that the artist missed.



Prepare the finished Isometric drawing.

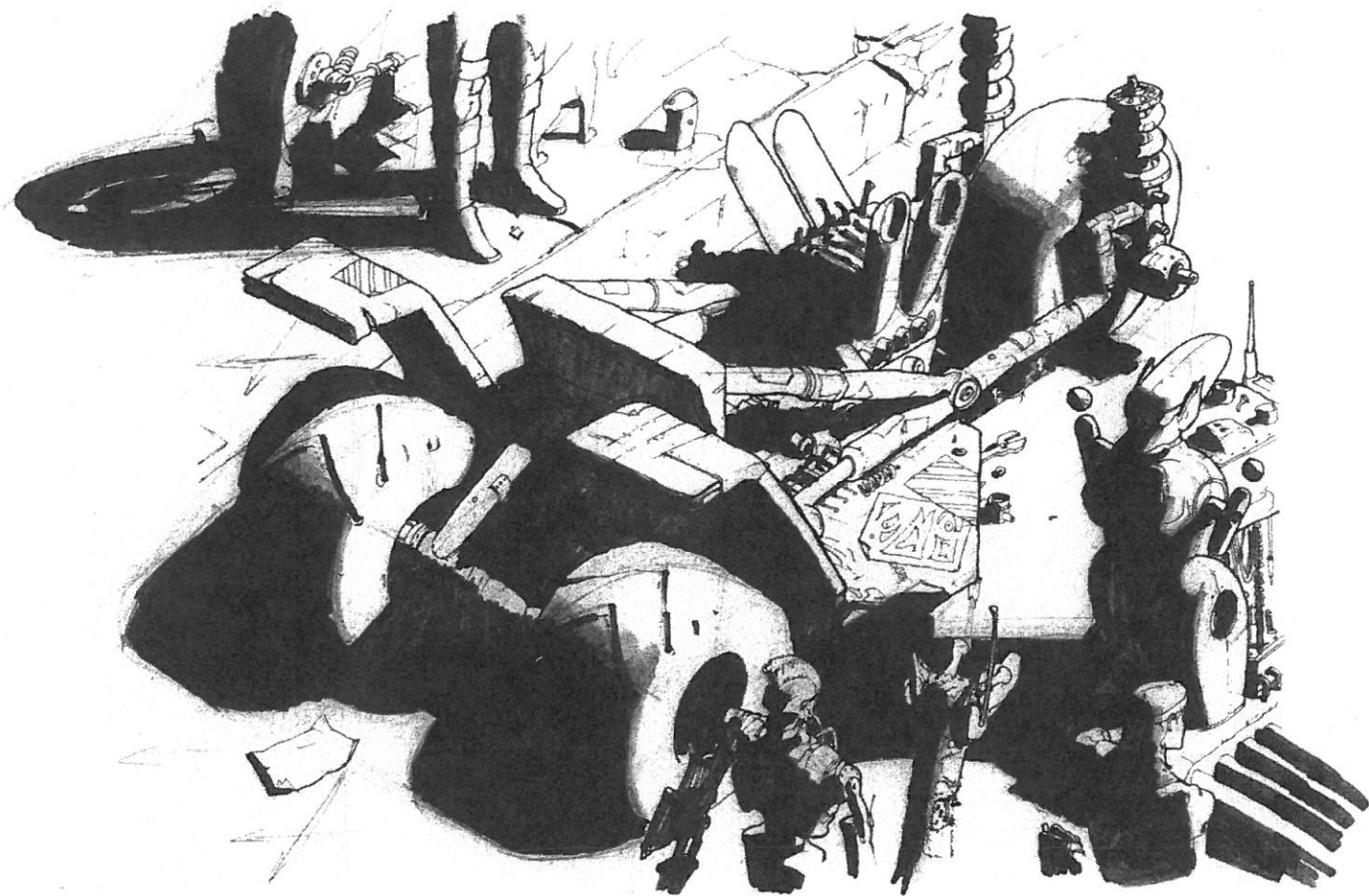
Determine the direction of the sunlight and the angle of the sunlight. In this case the direction comes from the right side of the picture (straight from the right), and the angle is 45 degrees from the top.

Apply the Direction of the sunlight to the bottom of the objects that touch the ground and the Angle of the sunlight to the top of the objects, and mark the intersections.

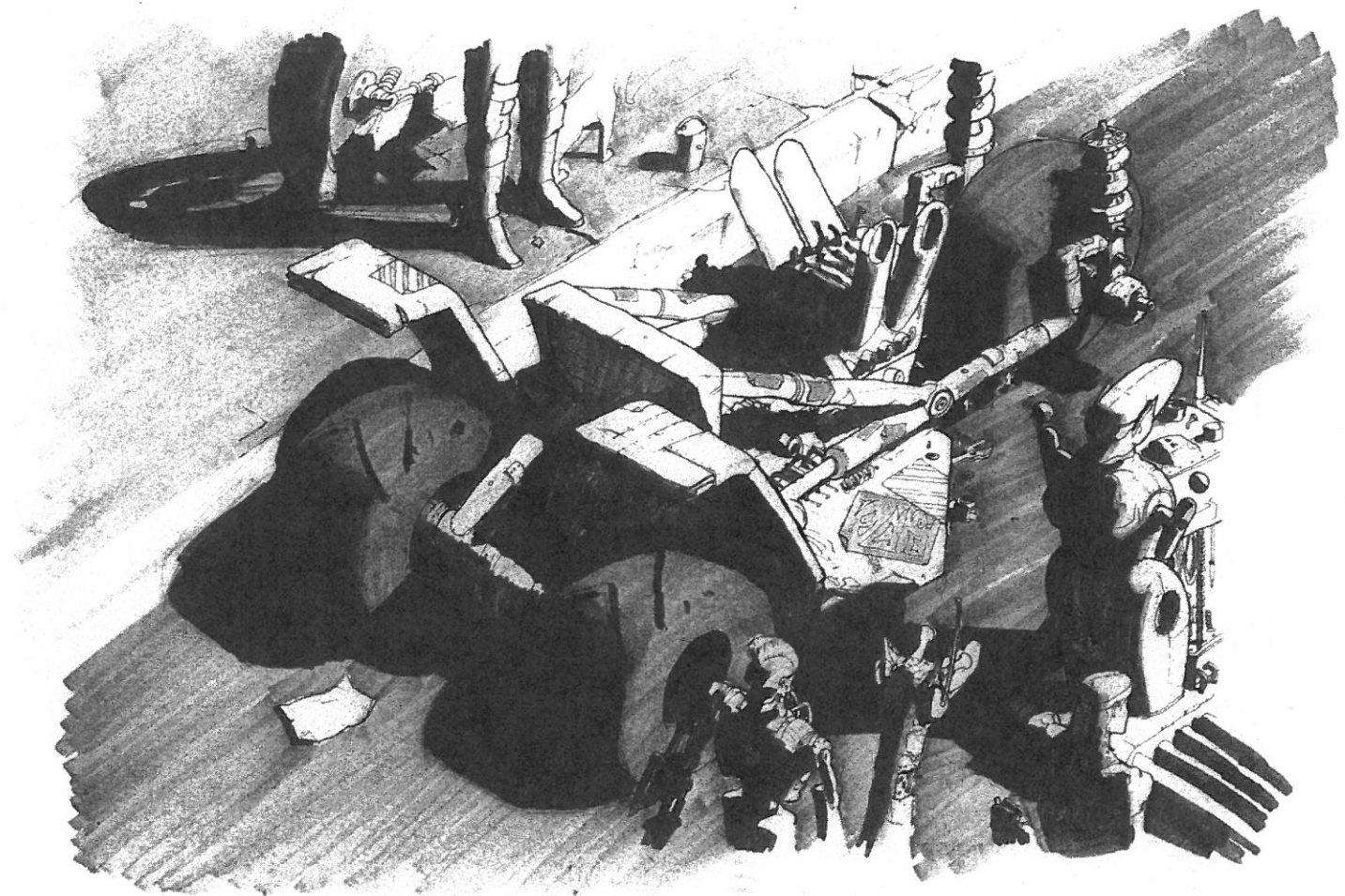
Block the form shadows (the shadows on the object itself), and the cast shadows (the shadows that cast to other objects).



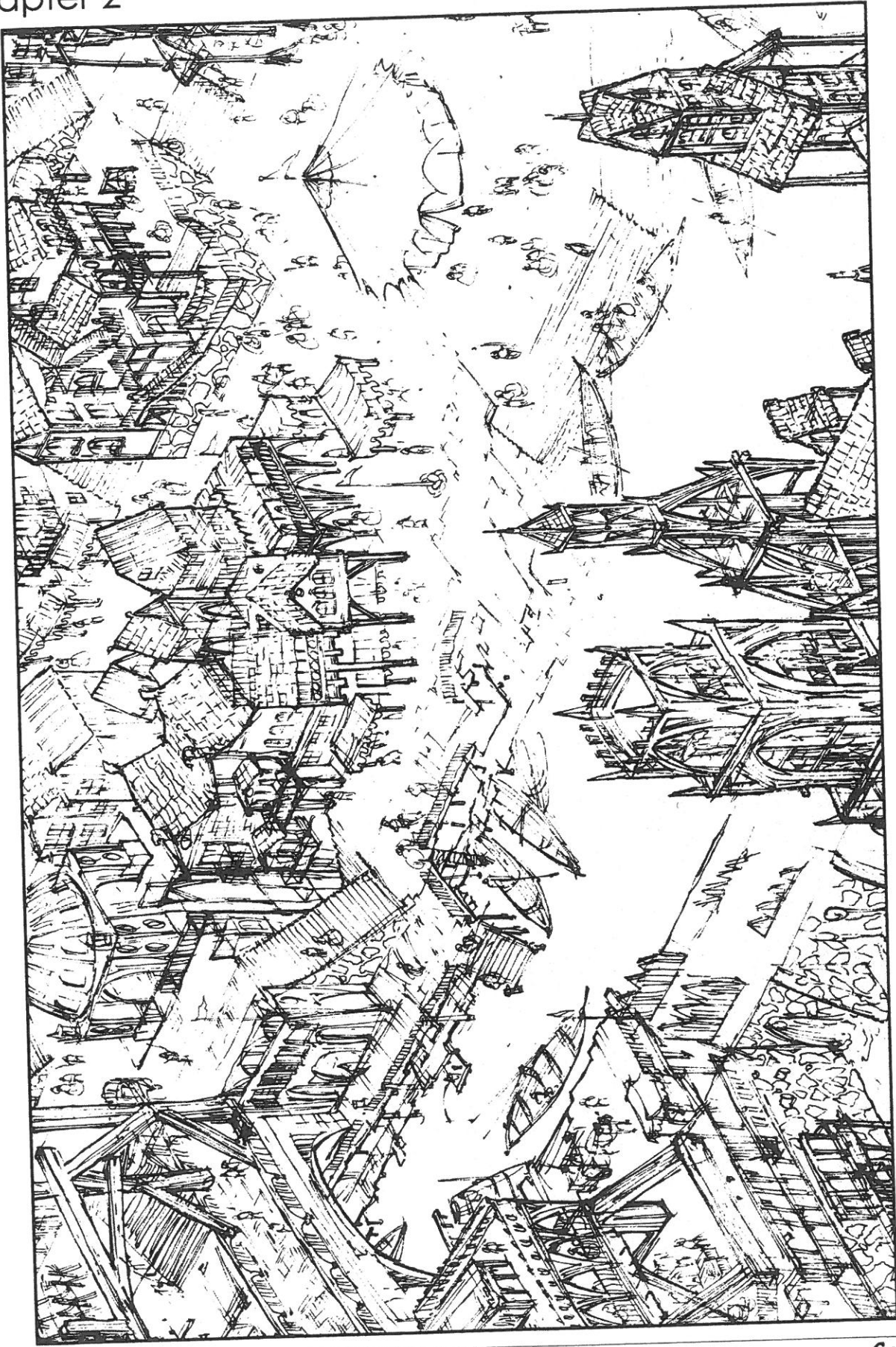
Block the form and the cast shadows with the same value.



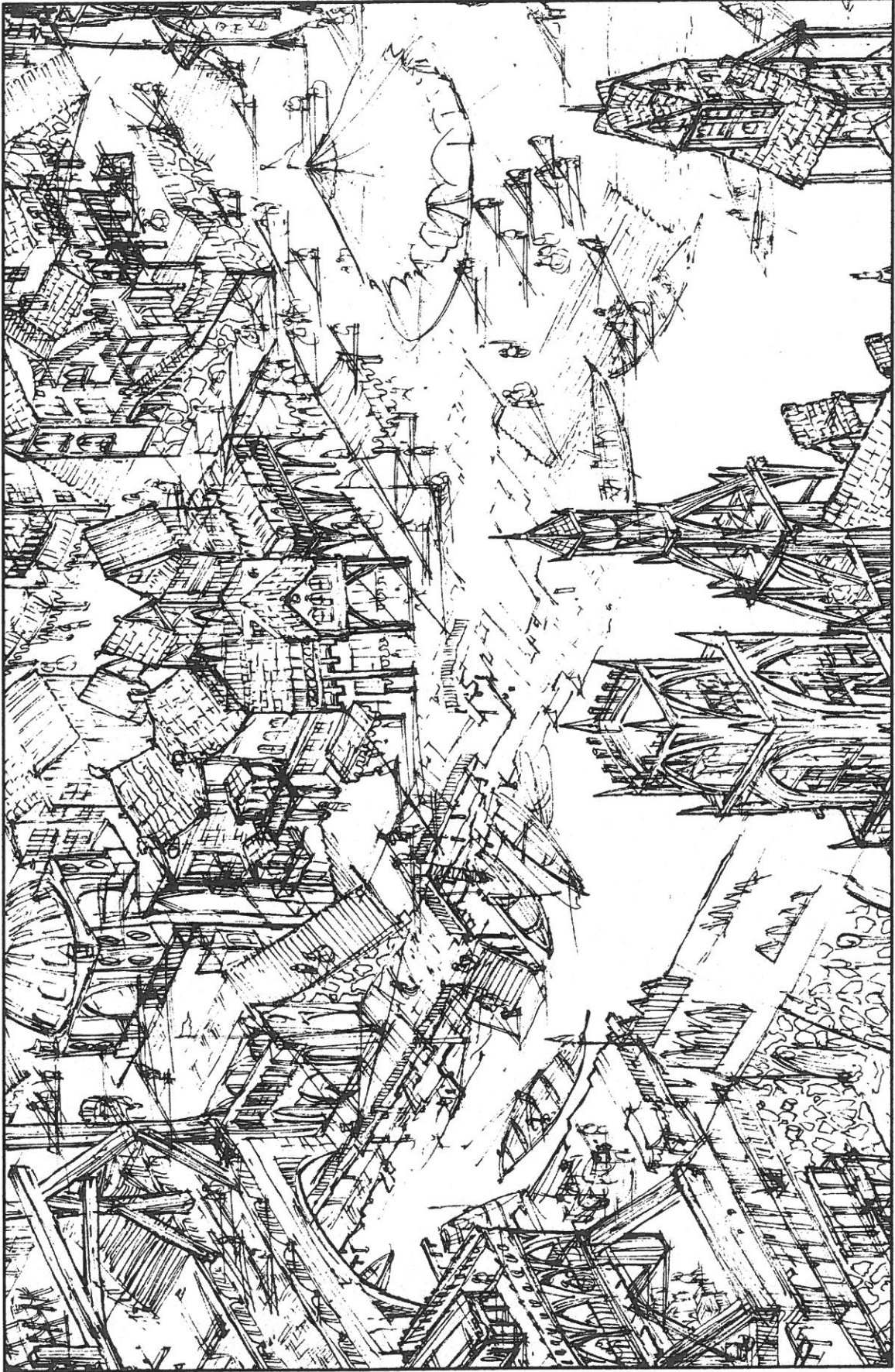
Apply soft edges, core shadows and darker cast shadows



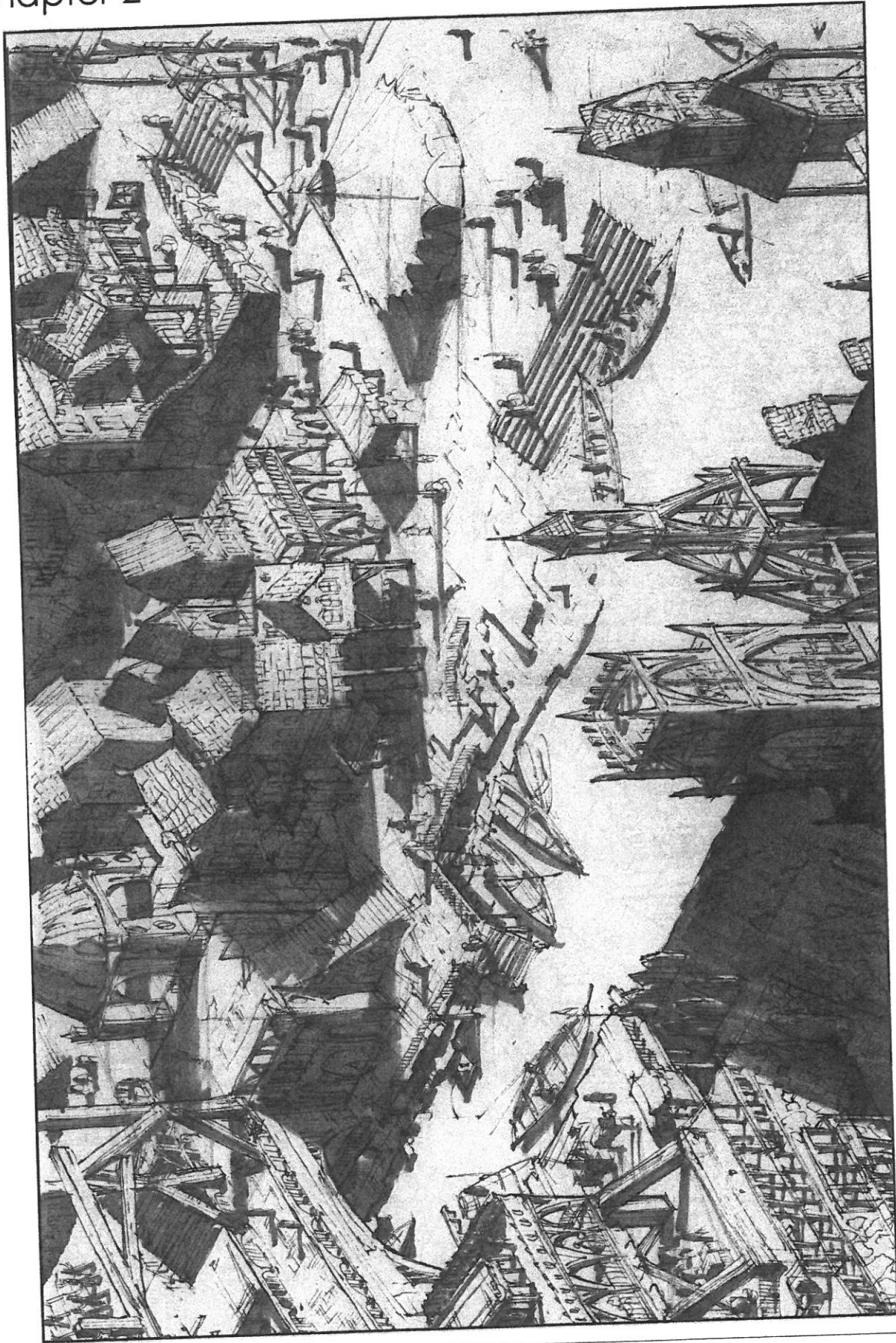
Apply local tone on the major areas.



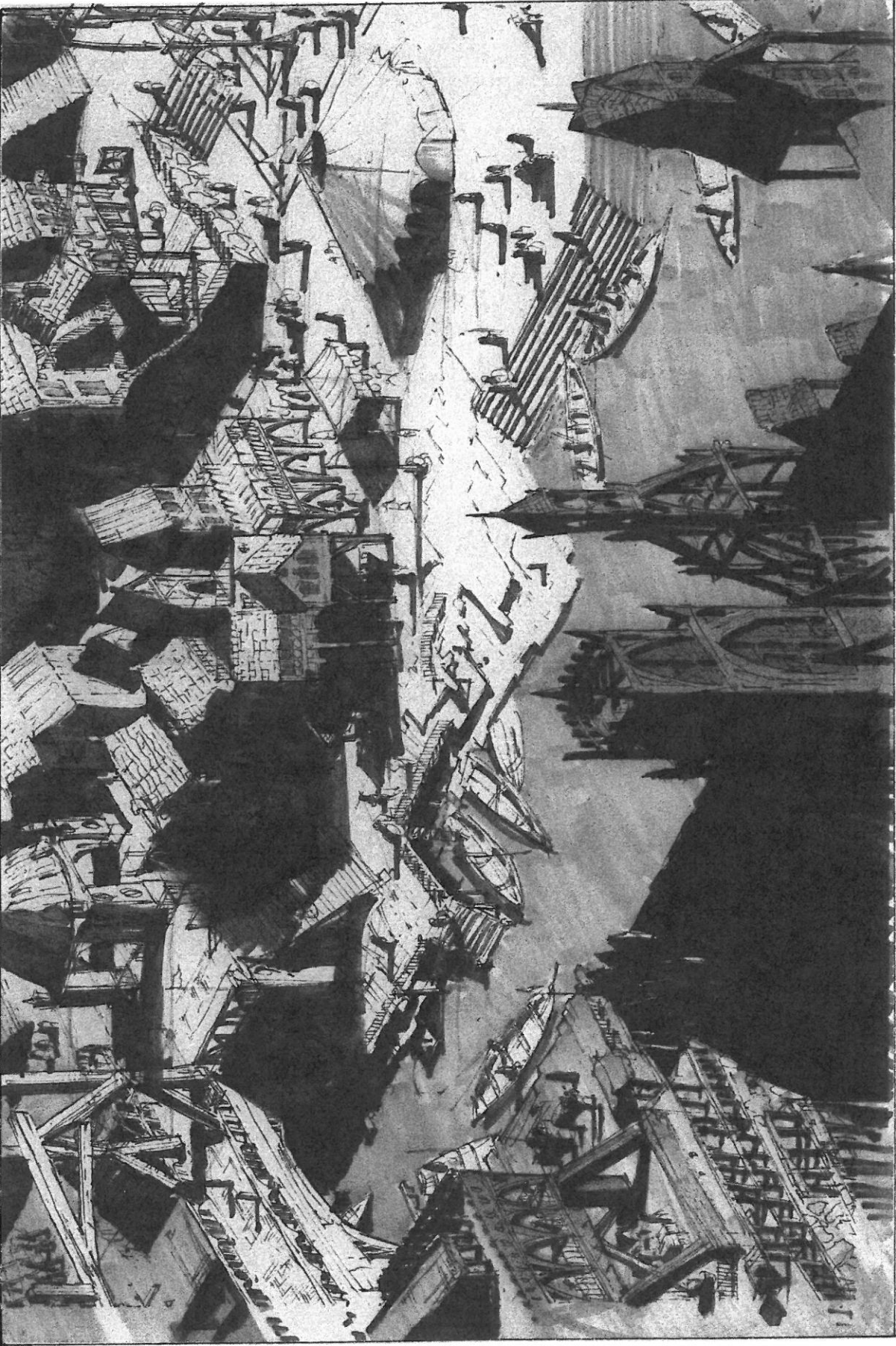
Prepare the finished Isometric line drawing.



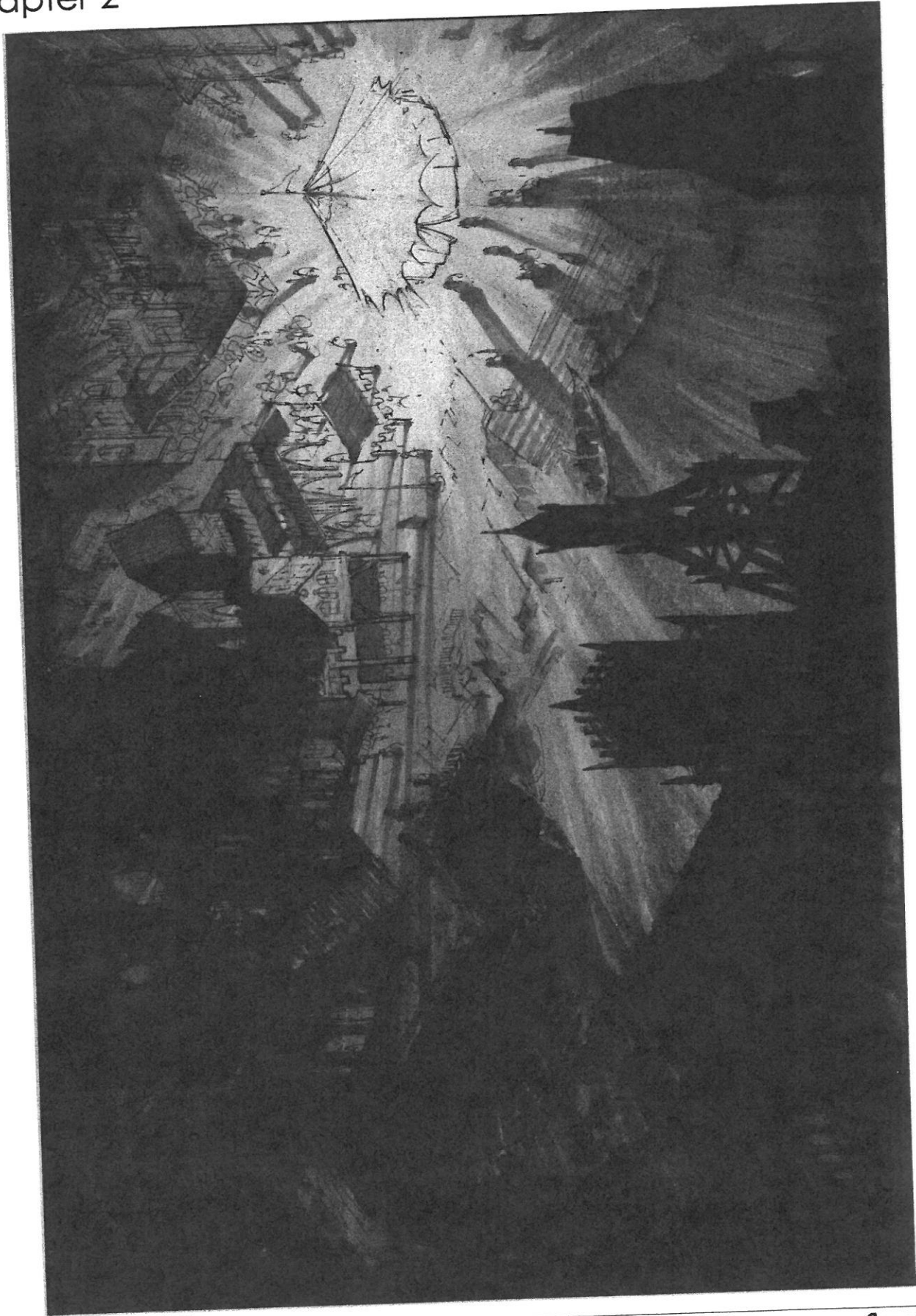
Determine the Direction of the sunlight and the angle of the sunlight



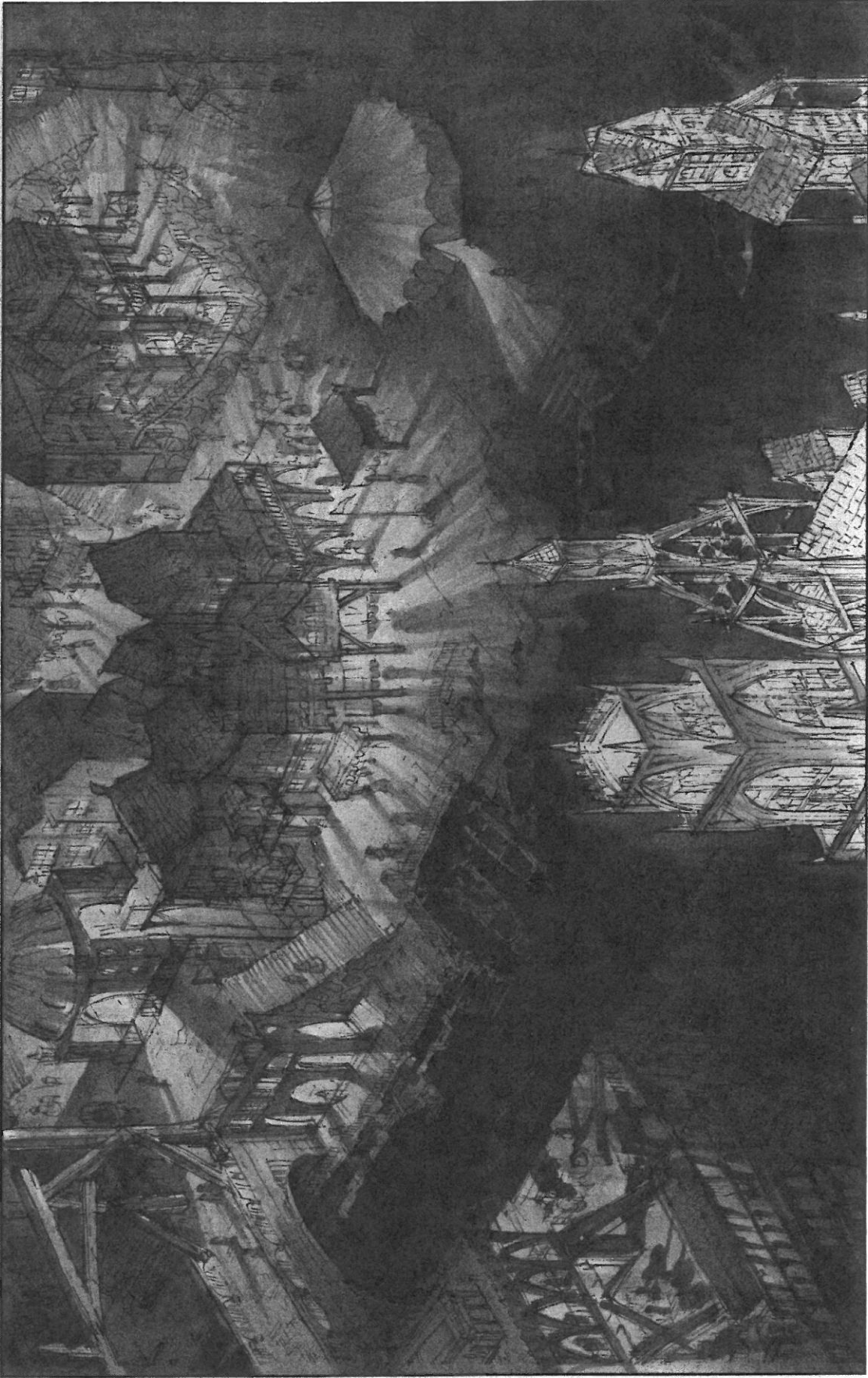
Block the form and the cast shadow with the same value.



Apply atmospheric perspective and details.



Isometric drawing with one local light source (see "local light on ground plane").



Isometric drawing with multiple local light sources.