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PERSPECTIVE

Perspective refers to the relationship of imaged objects in a photograph. This includes their relative positions and sizes and the space between them. In other words, perspective in the composition of a photograph is the way real three-dimensional objects are pictured in a photograph that has a two-dimensional plane. In photography, perspective is another illusion you use to produce photographs of quality composition. When you are making pictures, the camera always creates perspective. Because a camera automatically produces perspective, many novice photographers believe there is no need to know much about it. This attitude is far from correct. When you know the principles of perspective and skillfully apply them, the photographs you produce show a good rendition of the subject's form and shape, and the viewer is given the sensation of volume, space, depth, and distance. Additionally, the photographer can manipulate perspective to change the illusion of space and distance by either expanding or compressing these factors, therefore providing a sense of scale within the picture.

Linear Perspective

The human eye judges distance by the way elements within a scene diminish in size, and the angle at which lines and planes converge. This is called *linear perspective.* The distance between camera and subject and the lens focal length are critical factors affecting linear perspective. This perspective changes as the camera position or viewpoint changes. From a given position, changing only the lens focal length, and not the camera position, does not change the *actual* viewpoint, but may change the *apparent* viewpoint.

The use of different focal-length lenses in combination with different lens-to-subject distances helps you alter linear perspective in your pictures. When the focal length of the lens is changed but the lens-to-subject distance remains unchanged, there is a change in the image size of the objects, but no change in perspective. On the other hand, when the lens-to-subject distance and lens focal length are both changed, the relationship between objects is altered and perspective is changed. By using the right combination of camera-to-subject distance and lens focal length, a photographer can create a picture that looks deep or shallow. This feeling of depth or shallowness is only an illusion, but it is an important compositional factor.

Using a short-focal-length lens from a close camera-to-subject distance, or viewpoint, produces a picture with greater depth (not to be confused with depth of field) than would be produced with a standard lens. Conversely, using a long-focal-length lens from a more distant viewpoint produces a picture with less apparent depth.

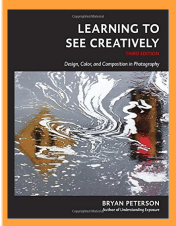
Rectilinear Perspective

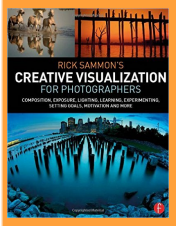
Most lenses produce rectilinear perspective that are typical of what the human eye sees. This is to say that lines that are straight in the subject are reproduced straight in the picture. Most pictures are made with rectilinear lenses.

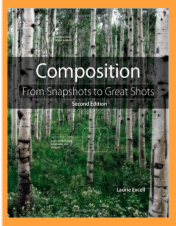
Fisheye lenses and the lenses used on panoramic cameras produce a false perspective. A panoramic lens produces panoramic or cylindrical perspective. In other words, all straight horizontal lines at the lens axis level are recorded as straight lines, and all other straight horizontal lines either above or below the lens axis level are reproduced as curved lines. The other false perspective is produced by a fisheye lens in which all straight lines in the subject are imaged as curved lines toward the edges of the picture.

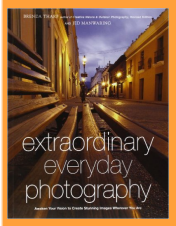
Vanishing Point Perspective

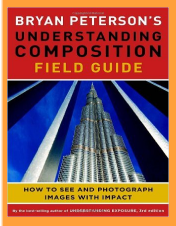
In vision, lines that are parallel to each other give the sensation of meeting at vanishing points. When parallel lines, either horizontal or vertical, are *perpendicular* to the lens axis, the vanishing points are assumed to be at infinity. Other lines, those which are *parallel* to the lens axis, and all other parallel lines at all other angles to the lens axis meet at definable vanishing points. Thus lines that are parallel to the lens axis, or nearly parallel, start in the front of the picture and meet at vanishing points within the picture or at finite points outside the picture (fig. 5-21).











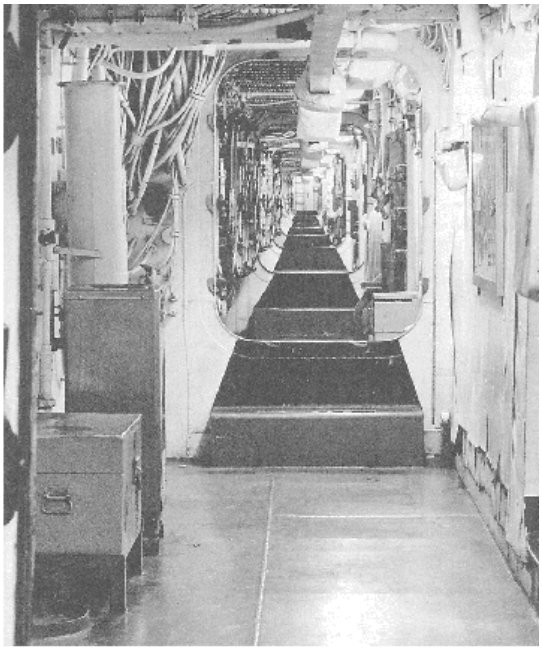


Figure 5-21.–Vanishing point perspective.

Height Perspective

The place where the base of an object is located on the ground in a picture is a clue to its distance from the camera viewpoint; for example, in a landscape scene, the ground or ground plane rises toward the horizon. The higher up in the ground area of the picture (up to the horizon) that the base of an object is located, the further away it seems from the viewpoint and the greater its height perspective.

Overlap Perspective

Another clue to distance in a photograph is overlap perspective. When subjects within the picture are on about the same line of sight, those objects closer to the camera viewpoint overlap more distant objects and partially hide them. It is obvious to the viewer that the partially obstructed object is behind the unobstructed object. This overlap is repeated many times within the picture and gives the viewer a sense of depth and a perception of the relative distance of objects.

Dwindling Size Perspective

Through the experience of vision, you are aware of the size of many common objects, such as people, trees, cars, buildings, and animals; for example, you are aware that most adults are about 5 to 6 feet tall; therefore, when two people are shown in a picture and one appears twice as tall as the other, you cannot assume that one is in reality taller than the other. Instead you assume the taller person is closer and the shorter person farther away from the camera viewpoint. In this same manner, you make a size relationship evaluation of all familiar objects. Thus you can make a distance determination from this size relationship evaluation. The farther away an object is from the viewpoint, the smaller it appears; therefore, when subjects of familiar size are included in a photograph, they help to establish the scale of the picture (fig. 5-22). Scale helps the viewer determine or visualize the actual size or relative size of the objects in the picture.

Figure 5-22.–Dwindling size perspective.

Volume Perspective

When a subject is lighted with very diffised light, the three-dimensional form or volume of the subject is difficult to perceive because of the lack of distinct shadows. If, on the other hand, subjects are lighted with strong directional light from angles that cause part of the subject to be fully lighted and other parts to be in shadow, a visual clue of the subject's form or volume is provided When a number of

such objects are included within the picture area, the perception of form, volume, and depth is increased. When front or side lighting is used, the length, depth, and shape of the shadows cast on the ground provide a perspective of each object's volume. Also, the distance between shadows cast on the ground helps you to perceive the overall depth of the scene.

Atmospheric Perspective

Figure 5-23.–Atmospheric perspective.

For all practical purposes, air is transparent. For most photography, this is fundamentally true; however, when pictures are made of subjects at great distances, the air is actually less than fully transparent. This is because air contains very fine particles of water vapor, dust, smoke, and so on. These particles scatter light and change its direction. The presence of scattering shows distant subjects in pictures as having a veil or haze. The appearance or effect of this scattering is proportional to the distance of the objects from the viewpoint. The greater the distance, the greater the amount of veiling or haze (fig. 5-23). The effects of this scattering of light are additive, but vary with atmospheric conditions.In atmospheric perspective several factors must be considered:

- Contrast–The luminance of each object in a scene is a direct result of the objects reflective quality and the amount of light falling on it. When objects are far away, light from highly reflective objects is scattered; therefore, when viewed from a distance (or imaged on a print), the darker portions of these distant objects do not appear as dark and the contrast is reduced. When there are objects both near and far from the camera, the difference in contrast provides a perception of distance.
- Brightness–The particles in air that scatter light are also illuminated by the sun. This causes an increase in the overall brightness of the objects seen. This increase in luminance, coupled with a loss of contrast, causes objects in the distance to be seen and photographed as lighter in color than they would be at a closer distance.
- Color saturation–The scattering of light not only affects contrast and brightness but also color saturation.

  Color is defined by three qualities: *hue* (the actual wavelength), *saturation* (intensity or chroma), and brightness (reflective). A pure hue is fully saturated or undiluted. When a hue is desaturated or diluted, it is no longer pure but has gray intermingled with it. The actual colors of a distant scene appear to have less color saturation, because the light is scattered and also because of the overall presence of the desaturated (diluted) blue light of aerial haze. The original scene colors appear less saturated or pure when seen or photographed from a distance than from close-up; therefore, color saturation or desaturation allows the viewer to perceive distance in a color photograph.

- Sharpness–Because of atmospheric haze, there is a loss of image sharpness or definition in distant objects.
- This loss of sharpness is caused both by the lowering of contrast and the scattering of light. The loss of sharpness contributes to a sense of distance. This can be enhanced by setting the far limit of the lens depth of field just short of infinity. This procedure throws the most distant objects slightly out of focus. This combined with the other effects of aerial perspective intensities the sense of distance.

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