Space is a complex visual component. It not only defines the screen where all the other visual components are seen, but space itself has several subcomponents that must be explained. This chapter is divided into two parts. Part One defines the four subcomponents of space: deep, flat, limited, and ambiguous. Part Two discusses aspect ratio, surface divisions, and open and closed space.

PART ONE: THE PRIMARY SUBCOMPONENTS

The real world that we live in is three-dimensional, having height, width, and depth. But the physical nature of a screen is strictly two-dimensional. Movie, television, and computer screens are flat surfaces that can be measured in height and width but, practically speaking, have no depth.

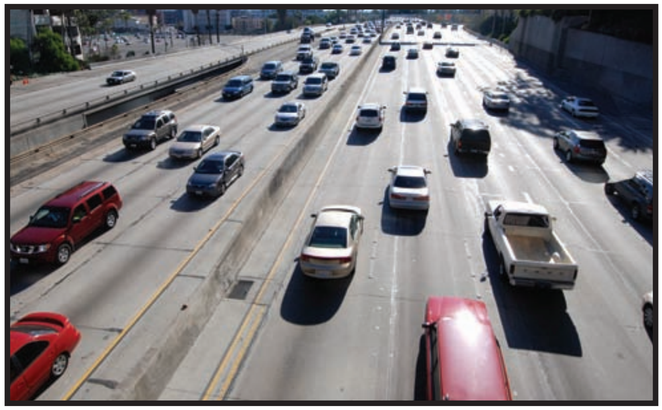
The challenge is to portray our three-dimensional world on a two-dimensional screen surface and have the result appear believably three-dimensional. A viewer should watch the screen's two-dimensional pictures and accept the images as a realistic representation of our three-dimensional world.

How can a two-dimensional screen surface display pictures that appear to have three dimensions or depth? The answer is not 3D movies or holograms (although the latter is truly a three-dimensional picture). Pictures can appear three-dimensional even though they're being viewed on flat two-dimensional screen surfaces.

Deep Space

Deep space is the illusion of a three-dimensional world on a two-dimensional screen surface. It's possible to give an audience the visual experience of seeing a three-dimensional space (height, width, and depth), even though all the depth is illusory. There is never real depth because the screen upon which the picture exists is only two-dimensional.

The audience believes they see depth on a two-dimensional screen because of depth cues.



This is a picture of busy freeway that stretches far into the distance. The cars in the right lanes race away from camera, and the cars on the left come from the distance, and move quickly past the camera. This description seems correct, but it's completely wrong. The picture is being displayed on a flat two-dimensional piece of paper (or a flat screen) so there can't be any real depth. Still, we believe that the freeway extends into the depth of the picture, and that some of the cars are closer, and others are farther away. There is something about this two-dimensional picture that convinces us we're seeing depth, where there's no actual depth at all. That something is called a depth cue.

The Depth Cues

Deep space, the illusion of depth on a two-dimensional surface, is created and controlled using the depth cues. Depth cues are visual elements that create the illusion of depth.

Perspective

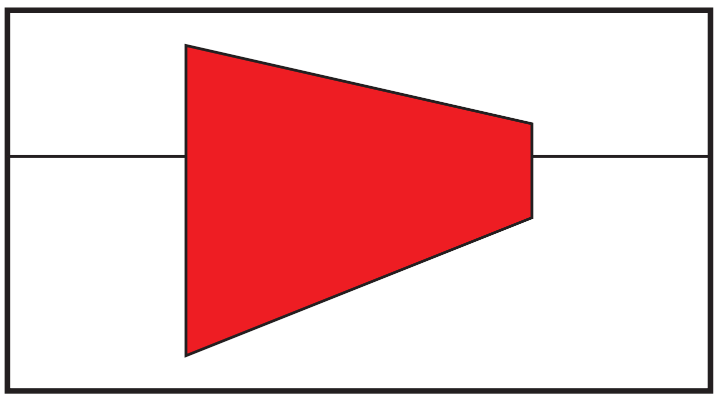
The most important depth cue is perspective. When creating illusory depth for a flat screen, it is essential to know how to recognize perspective in the real world.

Here's the two-dimensional plane that was introduced in Chapter 1. The plane's top and bottom lines are parallel and its left and right side lines are parallel. This is a frontal plane.

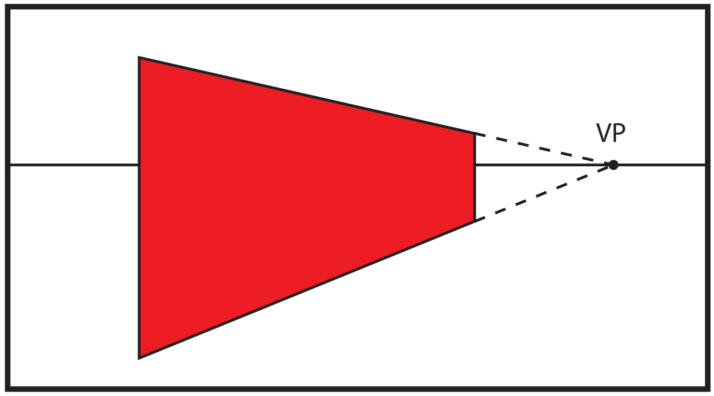
This wall is the same as the frontal plane. Visually, the frontal plane and the wall have no depth but they can be given the appearance of depth by adding perspective. For our purposes, perspective comes in three basic types: one-point, two-point, and three-point perspective.

One-Point Perspective

This is the simplest type of perspective.



Using the same wall, the viewer's position can be moved, revealing the depth cue of perspective.



The lines along the top and bottom of the plane now appear to meet or converge at a single point called a vanishing point or VP. Usually the vanishing point appears on the horizon, although it can appear anywhere. This creates a longitudinal plane, an extremely important cue to illusory depth. The longitudinal plane appears to have depth. One side of the plane looks farther away even though it exists on this flat paper surface.

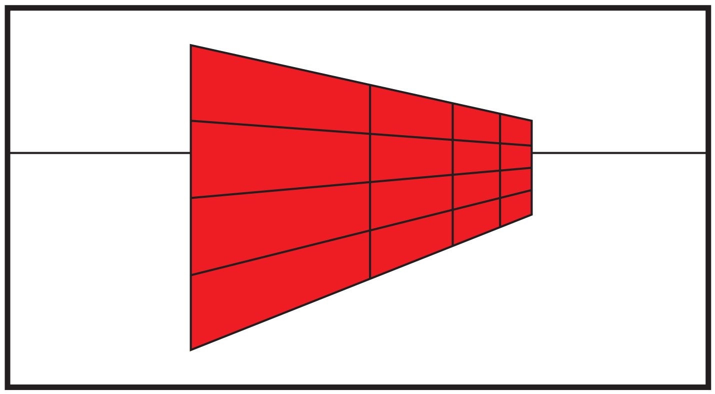
A classic example of one-point perspective occurs when standing in the middle of a railroad track. The rails appear to meet or converge at a vanishing point on the horizon. The rails never actually meet; they always remain parallel, but they appear to converge toward the vanishing point.

The rails of the train track create a longitudinal plane. This longitudinal plane would extend to the horizon, but in the diagram, the plane is shortened for clarity. We equate this convergence with distance. The more the rails converge, the farther away they seem.

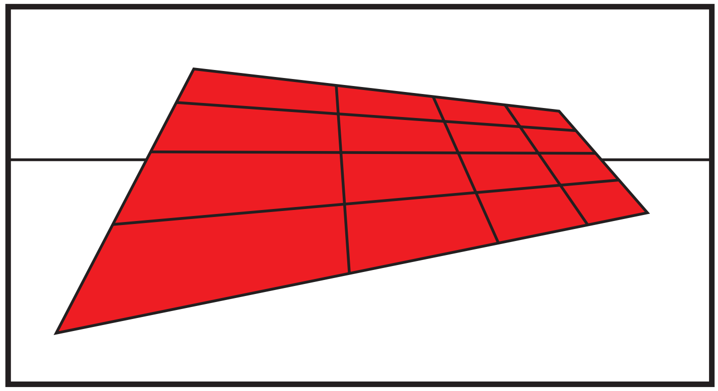
Convergence occurs in the real world and in the screen world, but in the screen world it happens on a two-dimensional surface, and is a cue to illusory depth. The railroad tracks seem to go into the depth of the picture, but there is no real depth on a flat screen.

Two-Point Perspective

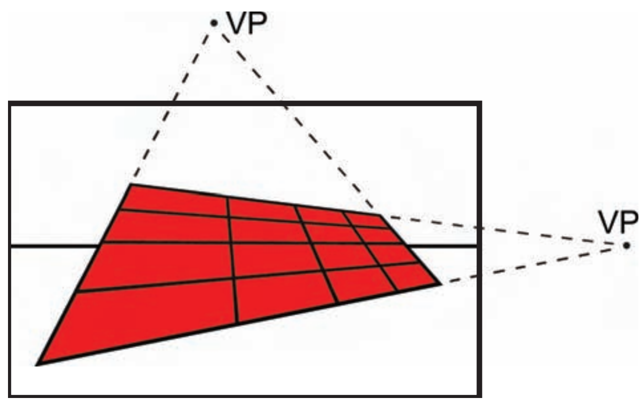
The next, more complex, level is two-point perspective, which uses two vanishing points. There are several ways that two-point perspective can be produced, shown here:



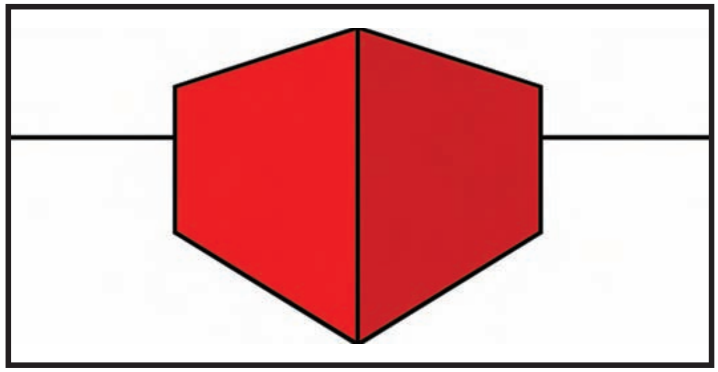
This longitudinal plane still has only one vanishing point. Additional lines have been added to the plane to make the convergence more obvious.



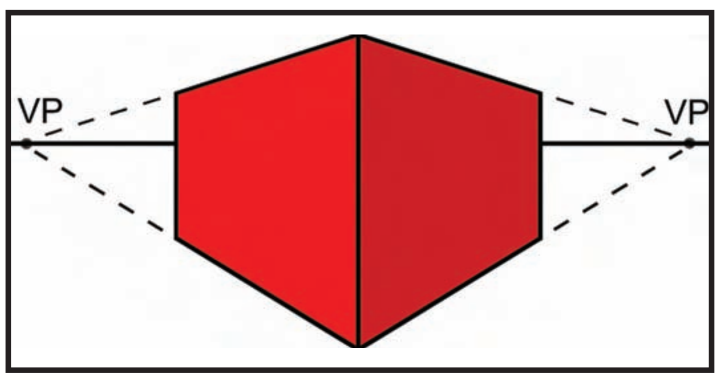
The longitudinal plane can be given a second vanishing point. If the viewing position is raised or lowered, the sides of the longitudinal plane no longer remain parallel.



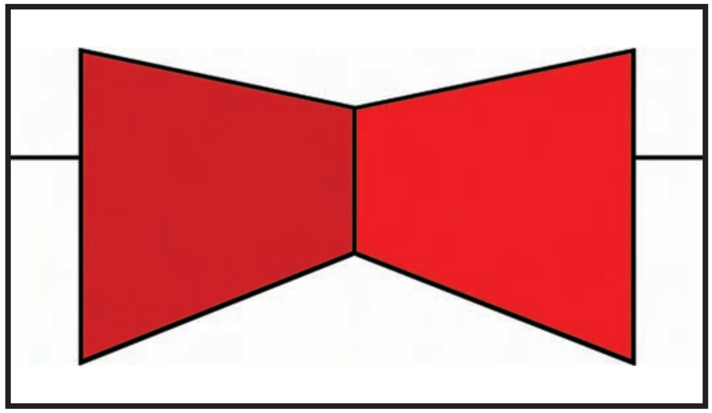
There are two vanishing points. The plane's top and bottom lines converge to one vanishing point located to the left of the frame. The sides of the plane converge to a second vanishing point located above the frame. If the viewing position is raised, the sides of the longitudinal plane will converge to a vanishing point below the frame.



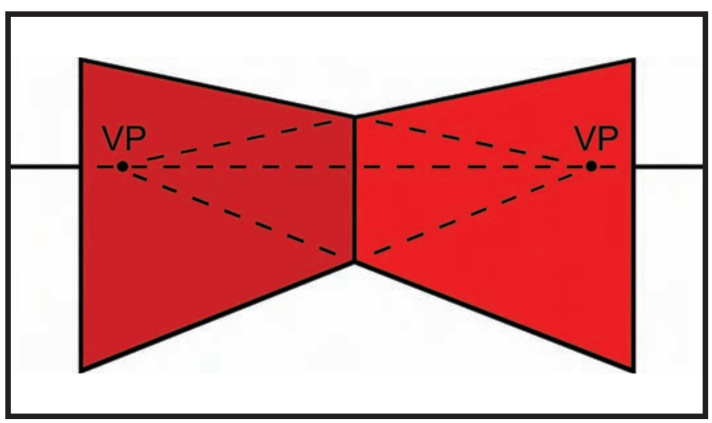
Two vanishing points can also be generated using two separate longitudinal surfaces.



Commonly, this occurs at the corners of buildings. The top and bottom lines of each longitudinal plane converge to separate vanishing points.



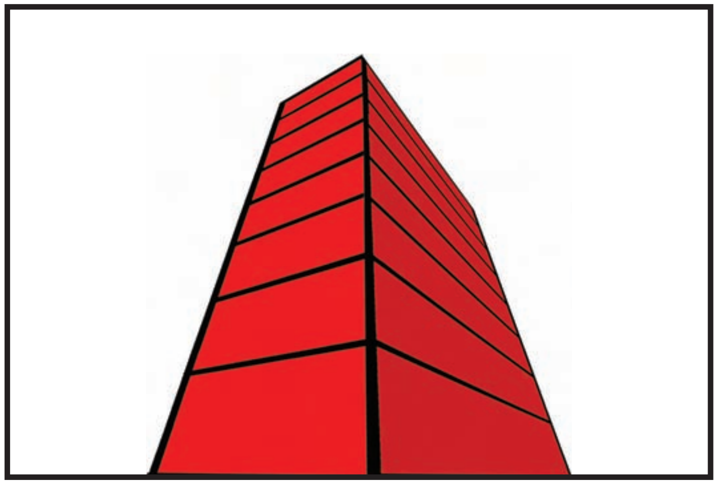
Inverting the two longitudinal planes reveals another example of two-point perspective. This occurs when looking into the corner of a room, for example.



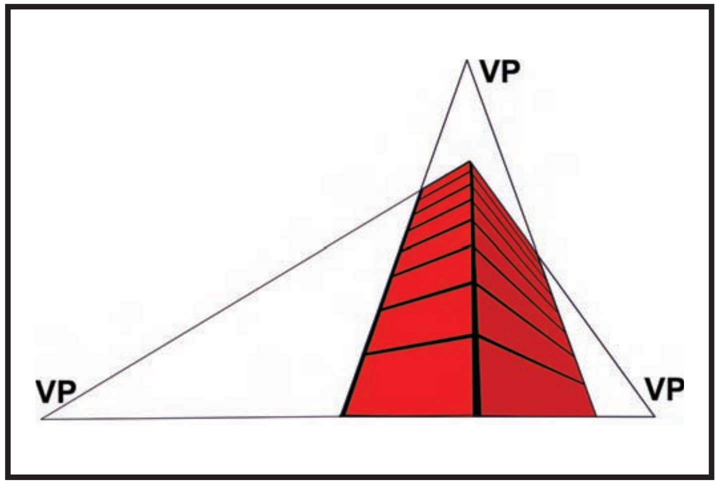
Although the vanishing points are hidden behind the longitudinal planes, there are still converging lines.

Three-Point Perspective

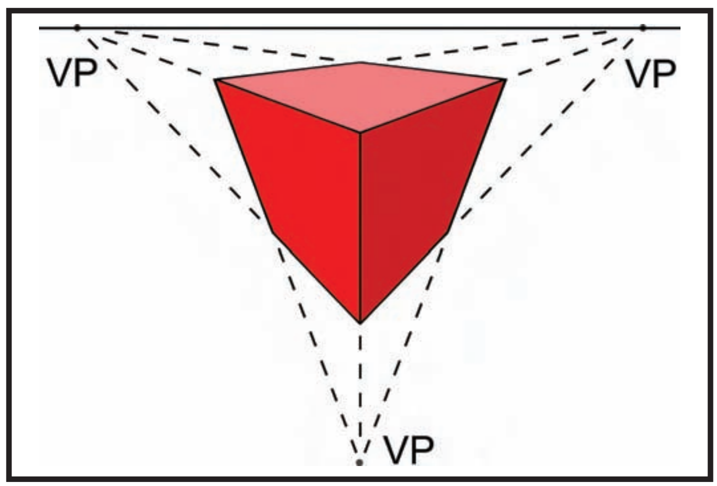
Three-point perspective is more complex than one- or two-point perspective. Examples are shown in the following pictures.



This is a view of a tall building. All the lines in the building will converge to one of three vanishing points.

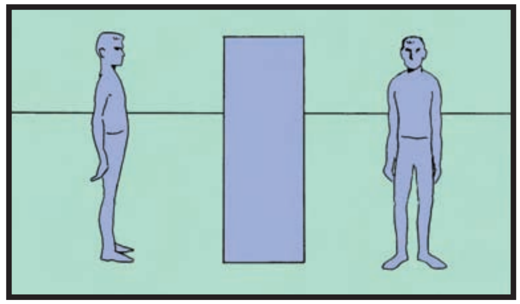


One vanishing point will appear above the building. The second and third vanishing points will appear along the horizon line to the building's left and right.

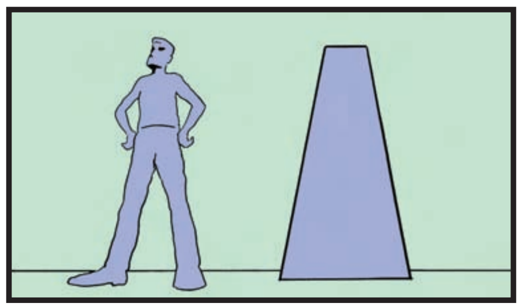


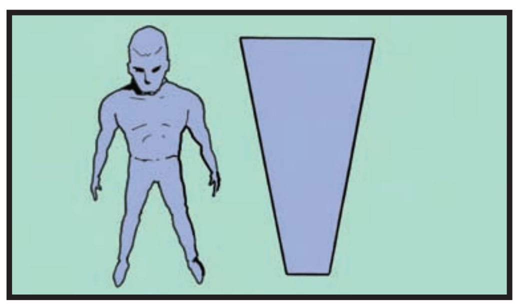
This shot also illustrates three-point perspective, but the viewing position is above the building.

Perspective, vanishing points, and longitudinal planes can be applied to any object in the real world, as the following pictures illustrate.

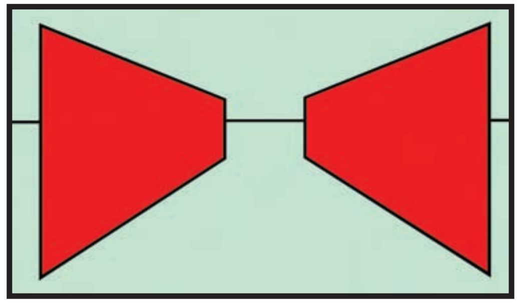


When the camera is at eye level, an actor is like a flat, frontal plane.

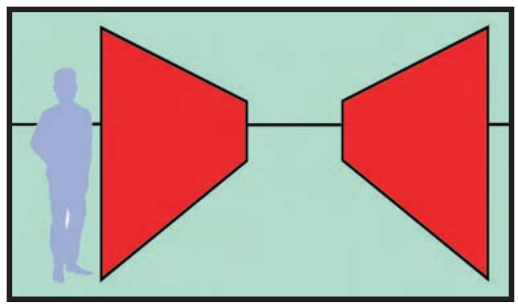




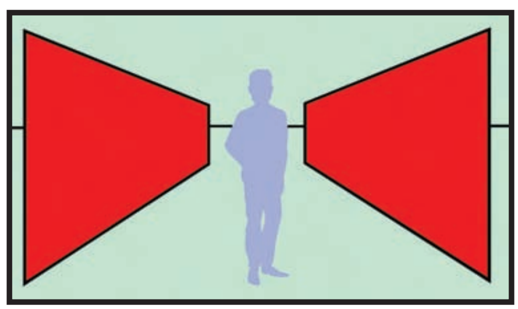
When the camera is lowered and tilted up, the actor becomes a longitudinal plane. This also occurs when the camera is raised and tilted down at the actor.



The audience's attention will usually be drawn to any on-screen vanishing point. Notice how your eye is drawn to the vanishing point between the two walls.

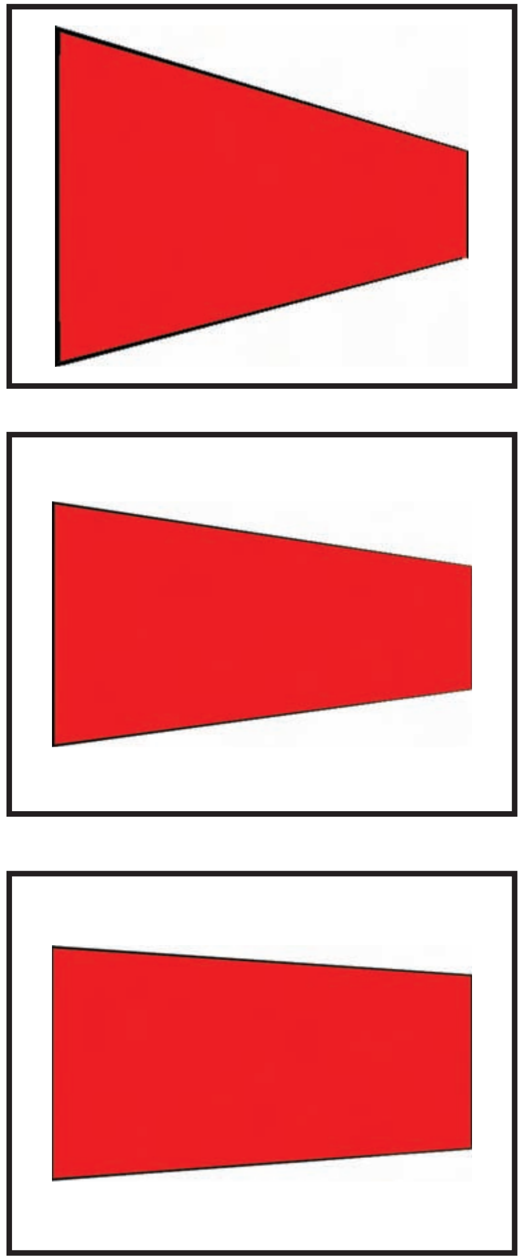


In this picture the viewer's attention is drawn to the actor, but it's also drawn to the vanishing point between the two walls.



Here, with the actor repositioned at the vanishing point between the two walls, the viewer's attention goes to the actor. The vanishing point helps keep the audience's attention on the actor.

Does this mean that actors must always be located on the vanishing point? Absolutely not. But it's important to know that vanishing points will usually attract an audience's attention.



As a vanishing point moves out of frame, its ability to attract the audience's attention decreases.

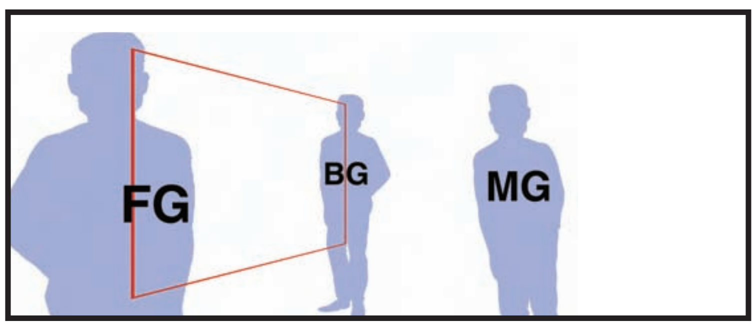
Moving from one-, two-, and three-point perspective is a visual progression. The more vanishing points, the greater the illusion of depth. One vanishing point will create the illusion of depth, but adding a second or third point will enhance the illusion of deep space.

It's possible to use four, five, twenty, or more vanishing points in a picture. If this were a drawing exercise (and it isn't) we'd spend time learning the complexities of multiple point perspective. But an audience watching a movie or video doesn't notice more than three vanishing points. This limitation is an advantage for the picture maker because it means there are only three levels of illusory depth possible when using perspective and convergence.

Remember that no matter how many vanishing points are added, there isn't any real depth. The drawings and photographs used here to illustrate deep space exist on a flat, two-dimensional page surface. All the depth is illusory.

Size Difference

As an object of known size gets smaller, it appears farther away. As an object of known size gets larger, it appears closer.



This shot has depth because the three people have been staged on three separate planes. One is on the FG (foreground) plane, another on the MG (midground) plane, and the third is on the BG (background) plane. Separating the objects onto FG, MG, and BG planes increases their size difference. Also notice how the FG and BG person create a longitudinal plane. Of course, all three people are exactly the same distance away because they're on the same flat surface (this page). The size change creates the illusion of depth.

This concept might seem simple and obvious, but size difference is an extremely important method of creating illusory depth on a flat surface. In Orson Welles' *Citizen Kane* (1941), the staging of actors and the illusion of