

Illusion of Space, Illusion of Motion

An event that shaped human history was the Battle of Issus, fought by Alexander the Great of Macedonia and Darius III of Persia on November 5, 333 BCE. Control of all of Asia Minor (present-day Turkey and the Near Middle East) was at stake. At age 47, Darius III ruled the greatest empire of its time, stretching across Asia Minor. At age 23, Alexander was king of the small mountainous empire north of modern-day Greece. Alexander began the battle on a rocky hillside and seemed doomed to fail. When Darius moved in for the kill, additional Macedonian troops swept in from the side, cut the Persian forces in half, and routed the larger army. This battle launched Alexander's 10-year campaign to extend his empire from Greece to India, thereby changing the course of human history.

In his *Battle of Issus* (4.1), Albrecht Altdorfer created an apocalyptic vision, combining the dramatic landscape and swirling armies with a crescent moon (representing Darius) and a blazing sun (representing Alexander). Commissioned by the Duke of Bavaria in anticipation of his own battle against Turkish forces, the painting was a clarion call to the Bavarian people. The illusion of space provided the setting for the desperate battle, while the illusion of motion

captured both the movement of men and the shimmering sky.

As noted in Chapter Three, each image and idea presents unique challenges. Jasper Johns's *Target with Plaster Casts* (figure 1.50, page 22) demanded a confrontational approach, and reaffirming the flat surface of an actual canvas was the best solution. Altdorfer, on the other hand, needed deep space for his epic battle. How can you best meet the challenges presented by your own ideas? In this chapter, we explore ways to create the illusion of space and of motion and consider the conceptual implications of each.



4.1 Albrecht Altdorfer, *Battle of Issus*, 1529.
Limewood, 47¼ × 62¼ in. (120 × 158 cm).

CREATING THE ILLUSION OF SPACE

Linear Perspective

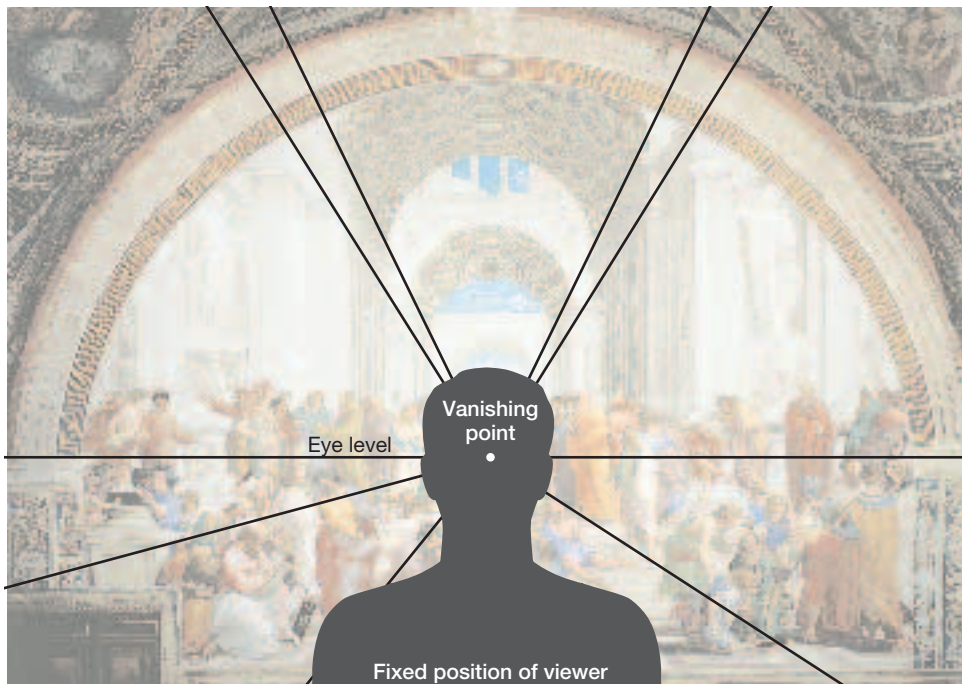
Linear perspective is a mathematical system for projecting the apparent dimensions of a three-dimensional object onto a flat surface. This surface, called the **picture plane**, is comparable to a window overlooking a city street. By tracing the outlines of the buildings on the pane of glass, you can make a simple perspective drawing.

Developed during the Renaissance, perspective offered a methodical approach to depicting the rational reality perceived by artists in the fifteenth century. It soon gained wide acceptance as a means of systematically diminishing the size of objects as they recede in space. Raphael's *School of Athens* (figure 4.2) is one example. A broad arch in the foreground frames the compositional stage. Three additional arches diminish in size, pulling us into the painting. The diagonal lines in the buildings and floor converge at a point in the center. The viewer is invited to enter into an illusory world.

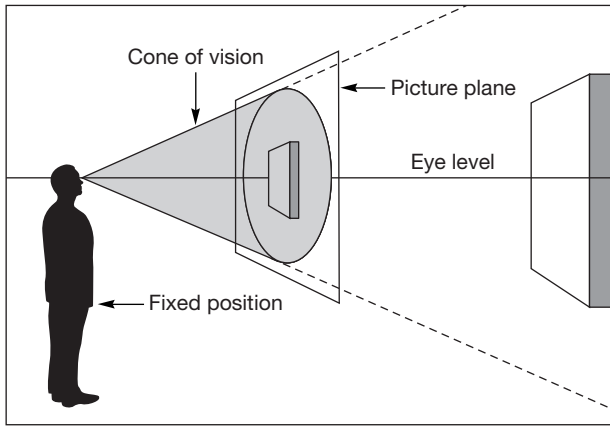
Even though many recent philosophical and aesthetic theories challenge this conception of reality, perspective remains the most pervasive Western

system for suggesting three-dimensionality on the two-dimensional surface. Linear perspective is based on five basic concepts, shown in figures 4.3 and 4.4:

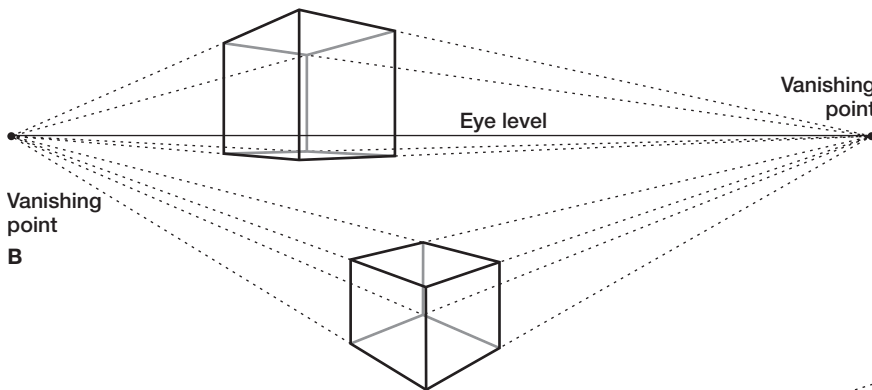
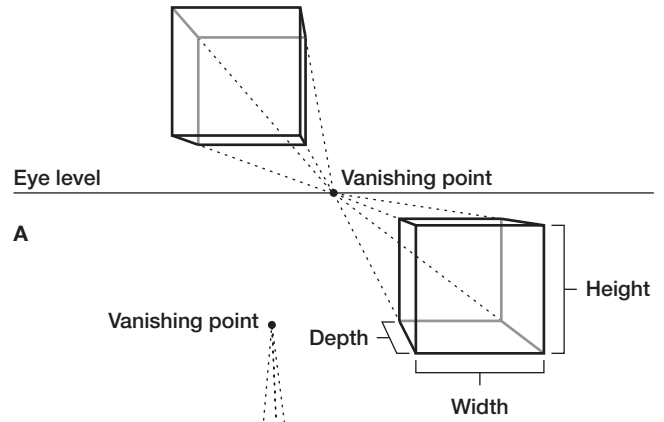
1. Objects appear to diminish in size as they recede into the distance. Perspective is possible because the rate at which objects appear to diminish is regular and consistent.
2. The point at which objects disappear entirely is called a **vanishing point**. Sets of parallel lines (such as train tracks) converge at a vanishing point as they go into the distance, creating an illusion of space.
3. In basic one- and two-point perspective, all vanishing points are positioned on the **eye level**, or **horizon line**, which is level with the artist's eyes.
4. Because all proportional relationships shift with each change in position, a fixed viewing position is an essential characteristic of linear perspective.
5. Only a limited area is clearly visible from a fixed position. To accommodate a larger viewing area, you must move farther away from the object to be drawn. This expands the **cone of vision** and increases the area being viewed.



4.2 Perspective used in Raphael's *School of Athens* (for the full painting, see figure 7.3 on page 145).



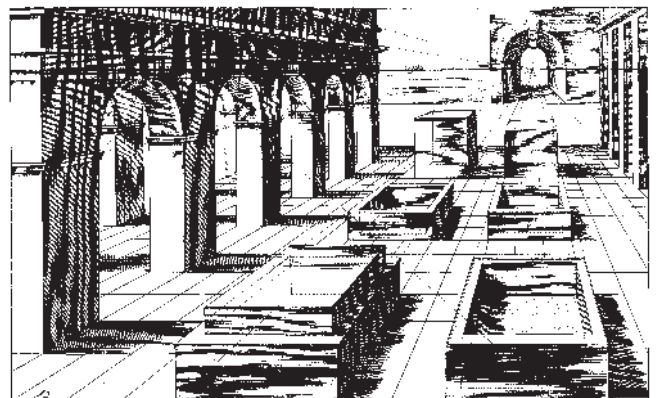
4.3 Fundamentals of linear perspective.



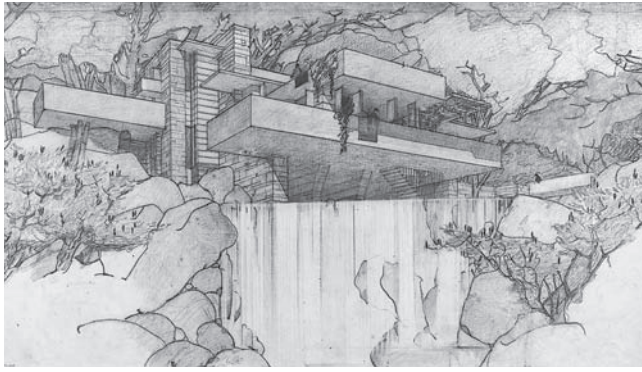
4.4A–C Examples of one- (A), two- (B), and three-point (C) perspective.

One-point perspective is used to represent a straight frontal view of a scene. In this type of perspective, the top and bottom lines of a cube (representing width) are horizontal — that is, they are parallel to the horizon line or eye level (4.4A). The lines representing depth are angled to converge on a single point at eye level, and the lines representing height are perpendicular to the horizon line. One-point perspective is relatively simple to master and can pull the viewer into the image with a single dramatic focal point (4.5).

Two-point perspective is effective for representing an object that is angled in space. A cube drawn in two-point perspective will not have any lines positioned parallel to the horizon line. Instead, the



4.5 Jan Vredeman de Vries, *Perspective Study*, from *Perspective*, Leiden, 1604.



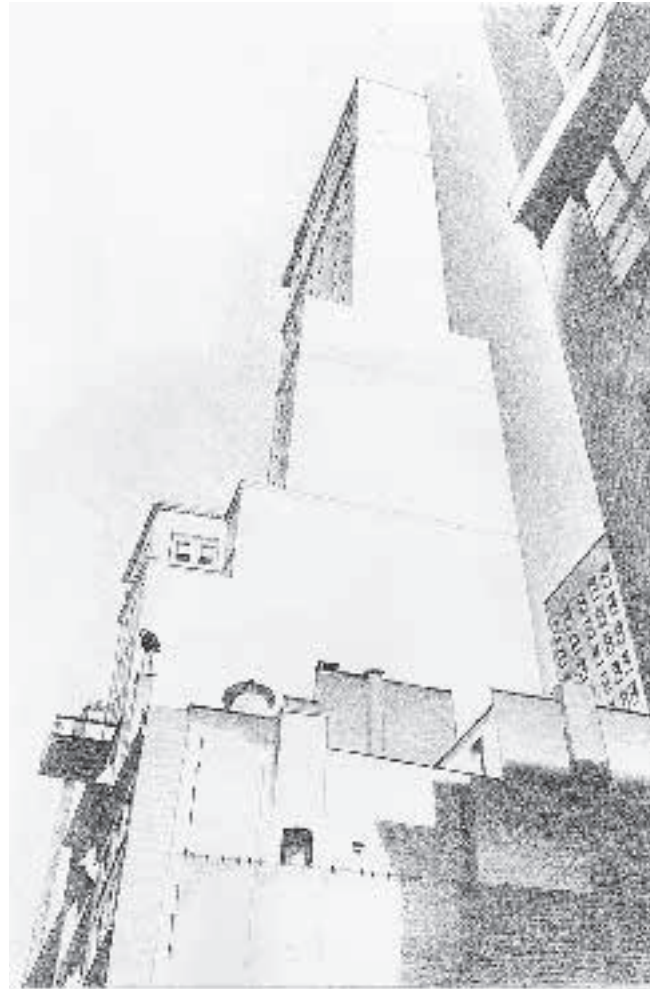
4.6 Frank Lloyd Wright, Detail from Drawing for *Fallingwater*, Kaufmann House, Bear Run, Pennsylvania, 1936. 15% × 27¼ in. (39 × 69 cm).

lines representing depth and width are angled to converge on two vanishing points (4.4B). Because two-point perspective is effective in showing both the front and sides of a structure, it is often used for diagrams and architectural drawings (4.6).

In one- and two-point perspective, the lines representing height are perpendicular to the horizon line. In **three-point perspective** (4.4C), these lines are tilted so that they converge on a third vanishing point, high above or below eye level. The lines representing depth and width converge on two points at eye level, as in two-point perspective. Three-point perspective is used to exaggerate the sense of space and to present a unique “bird’s-eye” or “worm’s-eye” view, as illustrated by Charles Sheeler’s *Delmonico Building* (4.7).

Other Ways to Create the Illusion of Space

- **Overlap.** Overlap is the simplest way to suggest space, and it can be especially effective when combined with size variation. In *Deposition* (4.8), Rogier van der Weyden used overlap combined with value to create a convincing drama within a crowded compositional space.
- **Size variation.** Because the diminishing size of distant objects is a basic characteristic of human vision, any systematic variation in size can enhance the illusion of space. This effect is demonstrated most clearly when the distance is great. In Ansel Adams’s *Monolith, The Face of Half Dome* (see page 17), the imposing cliff in the foreground rapidly diminishes in size as it moves back in space.



4.7 Charles Sheeler, *Delmonico Building*, 1926. Lithograph, 9% × 6% in. (24.7 × 17.4 cm).

- **Definition.** Sharply focused shapes also tend to advance, while blurred shapes tend to recede. When we look at a landscape, dust and water droplets in the air blur outlines and add a blue-gray color to distant shapes. This effect is known as **atmospheric perspective**. In *The Rocky Mountains, Lander’s Peak* (4.9), Albert Bierstadt combined dramatic lighting with atmospheric perspective to increase the illusion of space.
- **Location.** Visual elements placed near the top of the page tend to recede, while shapes placed at the bottom tend to advance. In *A Thousand Peaks and Myriad Ravines* (4.10) on page 96, the mountains at the top of the scroll appear more distant, despite their large size.
- **Color.** Contrast in hue, value, or color temperature can enhance the illusion of space.

4.8 Rogier van der Weyden, *Deposition*, from an altarpiece commissioned by the Crossbowman's Guild, Louvain, Brabant, Belgium, c. 1435. Oil on panel, 7 ft 2 $\frac{1}{2}$ in. \times 8 ft 7 $\frac{1}{8}$ in. (2.2 \times 2.6 m).



4.9 Albert Bierstadt, *The Rocky Mountains, Lander's Peak*, 1863. Oil on canvas, 6 ft 1 $\frac{1}{4}$ in. \times 10 ft $\frac{3}{4}$ in. (186.7 \times 306.7 cm).



4.10 Wang Hui, *A Thousand Peaks and Myriad Ravines*, Qing dynasty, 1693. Hanging scroll, ink on paper, 8 ft 2½ in. × 3 ft 4½ in. (2.54 × 1.03 m).

Using the Illusion of Space

Through the illusion of space, artists invite viewers to enter into an imaginary world. Expression can be heightened when this world is particularly intriguing or when the illusion is especially dramatic.

Amplified perspective can be defined as the exaggerated use of linear perspective to achieve a dramatic and engaging presentation of the subject. Amplified perspective is often created using an unusual viewing position, such as a bird's-eye view, accelerated spatial convergence, or distortion.

In Salvador Dalí's *Christ of St. John of the Cross* (4.11), amplified perspective changes our interpretation of the crucifixion of Jesus. Dramatic three-point perspective emphasizes the importance of the note pinned at the top of the cross. As we look down, the vulnerability of Jesus emphasizes his humanity, while the hovering position of the figure suggests his divinity.

Fractured space can be created when multiple viewpoints are combined in a single image. In his portrait of sculptor Henry Moore (4.12), David Hockney used multiple photographs to manipulate space and suggest the passage of time. The repeated hands gesture to us as we visually converse with the old master.

Layered space can be created when the foreground, middle ground, and background are clearly defined. Layered space is used extensively in the film *Citizen Kane*. In figure 4.13, young Charlie Kane plays in the background, while his mother in the foreground signs over his care to a lawyer. His father, who opposes this action, occupies the middle ground, caught between the mother and the child. The tensions in the family, the determination of the mother, and the innocence of the child are heightened when Charlie shouts, "The Union forever!" as part of his game. When the lawyer takes charge of Charlie, the family will be split apart forever. These three compositional layers communicate complex emotions while telling a story.



4.11 Salvador Dalí, *Christ of St. John of the Cross*, 1951. Oil on canvas, 80% × 45% in. (204.8 × 115.9 cm).

Key Questions

ILLUSION OF SPACE

- Which is more appropriate for your idea: a flat design or a spatial design?
- How can spatial depth be increased or decreased in your composition?
- If a spatial illusion is used, where will you place the viewer relative to the setting you create?



4.12 David Hockney, *Henry Moore Much Hadham 23rd July 1982*. Composite Polaroid, 21 × 14 in. (53 × 36 cm).

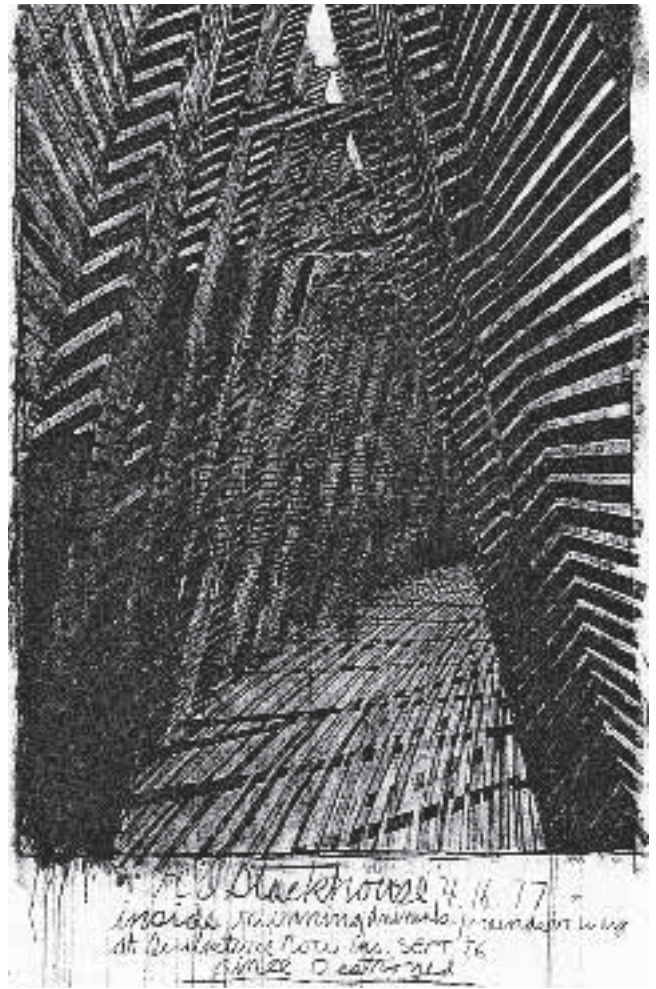


4.13 Scene from *Citizen Kane*. Three layers of space divide this shot from *Citizen Kane*: the mother in the foreground, the father in the middle ground, and the child in the background.

Spatial Dynamics

A Compositional Setting

The illusion of space creates a setting in which action can occur. Objects can move within this illusory world, or the setting itself can begin to shift. Both create **dynamic space**, space that embodies movement. In *Inside Running Animals/Reindeer Way*, Robert Stackhouse combined diagonal lines with definition and size variation to pull us into a mysterious tunnel (4.14). Ann Strassman's *Humphrey I* (4.15) comes charging out of the picture plane, ready to lick us or attack us. Cropping (the cutting away of part of the image) combined with vigorous brushstrokes helps push the dog forward. In Mark Messersmith's *Edge of Town* (4.16), a logging truck rushing into the background pulls the viewer into the painting, while the dead animals atop the hunter's car are thrust forward. However, the tree in the foreground traps this apocalyptic action, forcing the space to swirl around a central compositional pole. As we look down into the flaming car and up toward the white birds, we become even more disoriented. The space seems to bulge, twist, and rotate in the madness and mystery of the night.



4.14 Robert Stackhouse, *Inside Running Animals/Reindeer Way*, 1977. Mixed mediums, 64 × 43¼ × 2 in. (162.6 × 111 × 5.1 cm).

Key Questions

SPATIAL DYNAMICS

- Viewed as a setting in which action can occur, is your composition more dynamic (suggesting movement) or more static (suggesting stability)? What is the advantage of each?
- What is the advantage of shifting the viewpoint within a spatial setting?
- How can deliberate manipulation of spatial dynamics strengthen the idea or emotion you want to get across?



4.15 Ann Strassman, *Humphrey I*, 2004. Acrylic on cardboard, 70 × 65 in. (177.8 × 165.1 cm).



4.16 Mark Messersmith, *Edge of Town*, 2005. Oil on canvas and mixed mediums.

Constructing *Mulan*

Animators use the illusion of space with great inventiveness. Freed from the restrictions of reality, they can invent and explore a rich variety of dynamic spaces. Every type of space discussed in this chapter was used beautifully in Walt Disney's *Mulan*. From the opening shots to the grand finale, the illusion of space is of critical importance to the visual and conceptual power of the film.

- *Overlap*. After a brief battle with the invader Shan-Yu and his men, a Chinese soldier lights a signal fire to warn of the invasion. With Shan-Yu filling the foreground, we see six towers, with signal fires gradually blazing forth from each one (4.17A). Here, overlap and size variation enhance the illusion of space.



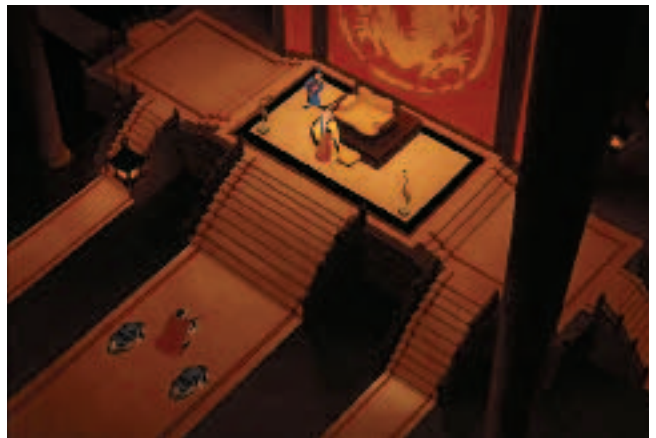
4.17A Cells from Disney's *Mulan*. © Disney Enterprises, Inc.

- *Linear perspective*. Linear perspective is used in the next sequence, when General Li enters the imperial palace to inform the emperor of the invasion. One-point perspective is used to create the large, majestic hall (4.17B). Because our eye level is that of a child, the hall seems even more intimidating and imposing. Positioned just above the vanishing point and framed by three hanging scrolls, the emperor epitomizes power.



4.17B

- *Angle of vision*. As the general approaches the throne, the angle of vision shifts to an aerial view. Three-point perspective is now used to emphasize the insignificance of the figures within this great hall (4.17C). We look down on the standing emperor and the prostrate soldiers.



4.17C

- *Atmospheric perspective*. Atmospheric perspective is often used as the troops travel through the mountains. After learning of the death of his father in battle, Captain Shang walks to the edge of a cliff. Like the massive mountains in the background, his seemingly invincible father has dissolved in the mist. A small man within a vast landscape, Captain Shang remains sharply focused, dignified, and powerful, even as he grieves (4.17D).



4.17D

Camera angle orients the viewer and can help determine the amount and type of space in each shot. An aerial view can provide the sweeping panorama needed to convey the enormity of a battle, while a low camera angle can provide an expansive view of the sky.

The major battle scene in *Mulan* beautifully demonstrates the critical role camera angle can play in a film. The enormity of the enemy army is shown in figure 4.17E. A low camera angle positions the Mongols along a ridge, above the small company of Chinese soldiers.



4.17E

As the Mongols pour over the ridge and gallop toward Mulan, the camera angle shifts to a slanted, oblique view (4.17F).



4.17F

A complete aerial view is used in the next shot (4.17G). The riders now pour across the screen.



4.17G

The shifting perspectives give us a more comprehensive view of the extent of the battle and emphasize the hopelessness of the emperor's warriors, who are confronted with an apparently invincible enemy. When Mulan grabs the one remaining cannon and races forward to create an avalanche, an aerial view is again used to show her vulnerability against the advancing enemy. Throughout the battle, shifts in camera angle provide the emotional and compositional power needed to create a dramatic battle sequence using the fewest number of shots.



4.18 Robert Longo, *Untitled*, 1980. From the *Men in Cities* series. Crayon and graphite on paper, 40½ × 28 in. (102.9 × 71.1 cm).

THE ILLUSION OF MOTION

Mulan is constructed from thousands of tiny frames. When run through a film projector, they create the fluid movement that is a hallmark of Disney animation. Animation is possible because we have the perceptual ability to integrate the sequential images into a continuous flow.

Substantial audience involvement is also required to create the illusion of motion within a static drawing or sculpture. When presented with multiple images on a single surface, we must feel the movement, complete the action, or anticipate the next event. Based on our day-to-day experience in an ever-changing world, we use our imagination to connect static images to create the illusion of motion.

The Kinesthetic Response

Kinesthetics is the science of movement. Through the very process of walking, we consistently engage in a complex balancing act as we fall forward, then catch ourselves with the next step. When we are confronted by a life-sized figure, such as the man from Robert Longo's *Men in Cities* series (4.18), the lurching movement of the model resonates on a physical level: we feel as well as see the gesture. Capturing the gesture at the right moment is critical. In Myron's *Discus Thrower* (4.19), the athlete is caught at the moment *before* the whirling vortex of energy explodes, releasing the disc. By capturing this moment rather than the moment of release, the sculptor has trapped within the marble the implied energy of the throw.



4.19 Myron, *Discus Thrower (Diskobolos)*. Roman copy after the original bronze of c. 450 BCE. Marble, height 5 ft 1 in. (1.54 m).



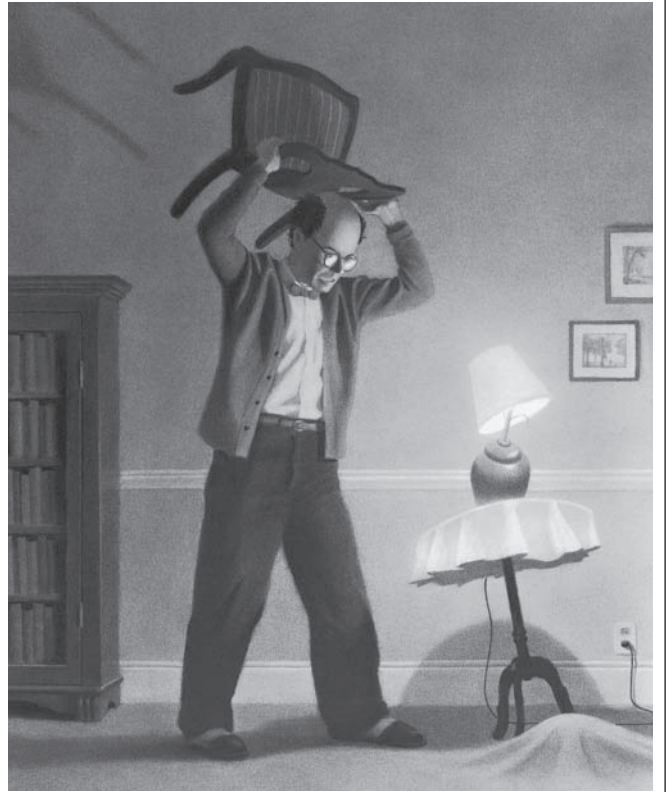
4.20 Henri Cartier-Bresson, *Valencia*, 1933. Photograph, 7¼ × 11½ in. (19.6 × 29.2 cm).

The Decisive Moment

Photographer Henri Cartier-Bresson used his understanding of impending change to formulate a theory of photography he called “the decisive moment.” A pioneer in the use of the 35-mm camera, he specialized in capturing the most telling

UNDER THE RUG

Two weeks passed and it happened again.



4.21 Chris Van Allsburg, “Under the Rug” from *The Mysteries of Harris Burdick*, Houghton-Mifflin, 1984.

moment in time. The space, emotions, and events he recorded in *Valencia* (4.20) are both fascinating and disturbing. Sharply focused and framed by the window, the policeman’s fierce face dominates the foreground. Squeezed between the target shapes and the wall on the left, a boy turns toward us apprehensively. A dissected target shape is balanced by the man’s monocle on the right and the boy’s face on the left. The resulting interplay of shapes creates a complex dialogue between childhood fears and adult authority.

Before and After

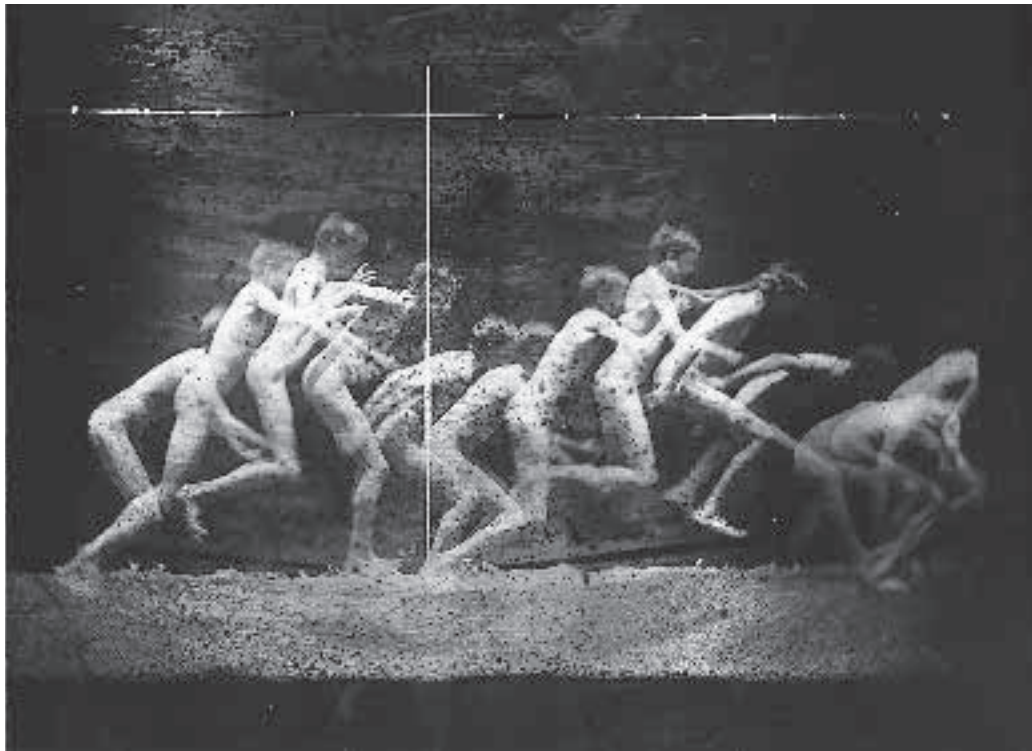
The kinesthetic response and the perception of a decisive moment are both based on our past experience and our ability to relate this experience to the images we see. Based on our physical experience, we can feel the awkward and unbalanced position of the Longo figure. Likewise, through our emotional experience, when we look at the Cartier-Bresson photograph, we realize that we are seeing a single moment in a more extensive story.

To create a story through a single image, many illustrators deliberately plan the moment that takes place *before* and the moment that takes place *after* an actual event. An example of this is illustrated in Chris Van Allsburg’s book *The Mysteries of Harris Burdick* (4.21). Each drawing in the book is accompanied by a title and a short piece of text. Based on the clues in the title, text, and image, we can invent all sorts of stories.

Fragmentation

As an object moves, it sequentially occupies various positions in space. Visual fragmentation can be used to simulate this effect in art. For example, the superimposed figures in Thomas Eakins’s *Double Jump* (4.22) record the multiple positions the man occupies during an athletic event. Even when figures are simply repeated, as in Edgar Degas’s *Frieze of Dancers* (4.23), movement is strongly suggested.

What attracted these two painters to explore the illusion of motion? Thomas Eakins was one of



4.22 Thomas Eakins, *Double Jump*, 1885. Modern print from a dry-plate negative, 4 × 5 in. (10.2 × 12.7 cm).



4.23 Edgar Degas, *Frieze of Dancers*, c. 1895. Oil on canvas, 27.6 × 79 in. (70 × 200.5 cm).

the first artists in America to use photography as a tool in the art-making process. His *Double Jump* was taken in the early days of photography when artists became fascinated by the study of movement and the possibility that they could capture an action through photography. Even though it is a still image, the viewer clearly understands that figure 4.22 shows one body captured at different stages in an action.

Although Edgar Degas was primarily a painter, he also became a talented photographer later in his career. He had always been fascinated by both

human and animal locomotion, and photography expanded his ability to observe and record the nuances of movement. *Frieze of Dancers* is a painting of four different dancers, yet it can also be perceived as a study of a single dancer in multiple poses.

For Eakins, Degas, Longo, and Van Allsburg, the illusion of motion expanded both the conceptual and the emotional possibilities in an image. Always searching for more effective means of visual expression, any artist or designer can gain from the use of this powerful tool.



4.24 Paul Jenkins and Jae Lee, from *Inhumans: "First Contact."* Volume 2, Issue 5, March 1999. Comic book. © 2010 Marvel Characters, Inc.

Multiplication

Multiplication can also play a role in visual storytelling. In this page from *Inhumans* (4.24), by Paul Jenkins and Jae Lee, a dialogue between an alien child and a human politician unfolds over five panels. Notice how “time” moves faster in the four smaller panels, and how a close-up is used when the child delivers his ultimatum. Multiplication creates a very different effect in George Tooker’s *Government Bureau* (4.25). Repeated images of the central male figure combined with endless bureaucratic faces create a scene from a nightmare. No matter where the man goes in this hall of mirrors, he always returns to the beginning.

Key Questions

ILLUSION OF MOTION

- Will the illusion of motion enhance the idea you want to express? If so, how can you create this illusion?
- To what extent is the illusion of motion affected by the illusion of space?
- What happens when static (unmoving) and dynamic (moving) shapes are used together in a design?



4.25 George Tooker, *Government Bureau*, 1956. Egg tempera on gesso panel, 19% × 29% in. (50 × 75 cm).

SUMMARY

- The illusion of space can be created through linear perspective, overlap, size variation, location, definition, atmospheric perspective, and use of color.
- Linear perspective is based on five fundamental concepts, listed on page 92.
- Three common types of linear perspective are one-point, two-point, and three-point perspective.
- Overlap, size variation, definition, location, and color can also create the illusion of space.
- The illusion of motion is often created by selecting the most decisive moment in an event, through fragmentation, or through various types of multiplication.

KEY TERMS

amplified perspective

atmospheric perspective

camera angle

cone of vision

dynamic space

eye level (horizon line)

fractured space

kinesthetics

layered space

linear perspective

one-point perspective

picture plane

three-point perspective

two-point perspective

vanishing point

STUDIO PROJECTS

To apply the concepts from this chapter in the studio, check out the Projects page in the Online Learning Center at www.mhhe.com/stewart4e. The following is a sample of the chapter-related assignments that are described in step-by-step detail.

Architectural Abstraction. An introduction to perspective.

Homage to Hockney. An exploration of space and movement.

Strata. Increasing complexity through layers of space.

Profile:

Ken Stout, Painter

Immediacy and Energy in Large Scale



Ken Stout is an internationally renowned figurative painter. He has shown his work widely, including group shows at the Nelson-Atkins Museum of Art in Kansas City and the Butler Museum of American Art, as well as solo shows at the Goldstrom Gallery in New York City and the Cité Internationale des Arts in Paris. *Intermission* was commissioned by the Walton Arts Center in Fayetteville, Arkansas, funded by Saatchi and Saatchi in 1992, and permanently installed in 1994.

MS: How did *Intermission* begin?

KS: I began work in 1989. During visits to Paris and Madrid, I was bowled over by a Toulouse-Lautrec mural I saw at the Orsay Museum and by a mural by Delacroix at St. Sulpice. Both were vibrant with energy. The strident reds and greens in the Delacroix sent the viewer's eyes hurtling around and through the composition. I was interested in a mural project because it gave me an opportunity to combine the immediacy of drawing with the richness of painting.

MS: Why show the intermission, not the play?

KS: It is a moment that is highly charged. The mural depicts a cross section of the theater, from backstage to stage and from audience to lobby. The performer onstage is like a toggle switch, connecting the audience to the action backstage. As he bows through the closing curtain, the audience begins to break apart, dissolving into its own private plays. Applause fills the theater, children begin to awaken, and neighbors discuss the performance. I wanted to pull the viewer into a scene bursting with energy, as if all things were in orbit, pushing, pulling, and flowing. The whole painting is a gesture, an embodiment of bodies in motion, with both the volumes and voids ignited with energy.

MS: Your preliminary research on this project was extensive. What did you learn from the masters?

KS: Mostly, I learned ways to increase compositional complexity without sacrificing gestural energy. These compositional lessons helped me sustain a vigorous visual pace for all 50 feet of the painting.

Technically, though, my work method was more exploratory and direct than is the usual practice.

First, the 300 preliminary drawings and paintings I did stand as autonomous images in themselves. I learned from all of them—but didn't copy any when I painted the mural. I confronted the painting directly, rather than replicating ideas I had worked out beforehand.

Second, I didn't graph out, project, or otherwise draw the outlines on the canvas. I just drew blue lines to divide the canvas into halves, quarters, and eighths, then drew freehand, using a brush attached to a 3-foot-long bamboo pole, starting with light washes in earth colors.

Finally, every figure was painted from life, using over 50 community members as models. They were amazingly generous and patient, considering it wasn't putting a penny in their pockets. This process increased the connection between the audience and the artwork, and we had a great party for everyone when the painting was installed.

MS: So it sounds like you didn't really know what would happen when you began to paint each day.

KS: Each model, each pose, and each prop provided variations and surprises. I actually used at least two models for each figure in the painting, which basically means that there is another 50-foot-long painting underneath the one that you see!

MS: What advice do you have for my students?

KS: Take risks. Without daring—indeed, without great daring—there is no beauty. We must go beyond ourselves if we are ever to fulfill our real potential.



Ken Stout, *Intermission*, 1994. Oil on canvas, 9 × 50 ft (2.74 × 15.24 m).



Georgiana Nehl and David Browne, *Solstice Greetings*, 1998. Color photograph of constructed assemblage, 5 × 5 in. (12.7 × 12.7 cm).