ACKNOWLEDGMENTS

My decision to build a perceptual drawing book around my students’ class assignments grew out of the observation that the students in my introductory perceptual drawing courses consistently produced more focused and more sensitive drawings after being exposed to successful student projects from previous semesters. I attributed this positive change in their performance to two factors: the images presented to them depicted successful solutions to the problems they were being asked to address thereby providing excellent visual guides that clarified the relevant issues of each lesson and showing current students the accomplishments of former students generated a healthy sense of peer competition that substantially “raised the bar” in terms of what each student should expect to accomplish in his/her drawings. As a result, this book can best be understood as an annotated “slide show” that documents what beginning drawing students can accomplish when they focus intelligently on the task of learning to record their observations in a drawing.

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SPECIAL THANKS

I am grateful to Cynthia Ward, my sponsoring and developmental editor for the first edition, and Meredith Grant, my developmental editor for the new chapter in this second edition, for their insight, understanding, and patience as they fine-tuned the words I used to convey the intuitive visual process that underlies observational drawing. They contributed to whatever clarity and cohesiveness can be found in the following pages.

I also thank my wife, Sue Kogan, for her loving support.

This book was initially conceived simply as a “portable slide show” of successful student projects that would, by example, instruct, motivate, and inspire beginning students in perceptual drawing. Over time the book evolved into something considerably more complicated than what was initially planned but I am satisfied knowing that it has, at the very least, recorded and showcased the enthusiasm, energy, intelligence, sensitivity, insight, patience, and accomplishments of a wonderful and diverse group of hard working, self-disciplined students from my introductory classes in perceptual drawing at the University of Miami.
I began this drawing text with the understanding that dozens of texts on the subject already exist. What this book has that the others do not is a focus on basic rendering skills and the spatial understanding needed for translating three-dimensional perceptions onto a two-dimensional surface.

*Drawing from Observation* builds upon the perceptual platform that was constructed in the fifteenth century by Brunelleschi, Alberti, Piero, and Leonardo. Although Modernist art movements of the last two hundred years have challenged the Renaissance notion of rational illusionistic space, there is tremendous value in learning to draw a “realistic” image from observation. Perceptual drawing offers the opportunity to develop insights into the very mechanisms of visual perception and is a versatile tool for visual problem-solving in every artistic discipline. And, in that it works well as a conceptual baseline against which to compare and contrast alternative aesthetic and conceptual approaches, it may even shed some light on the possible motivations of those who have consciously chosen to make art without it.

*Drawing from Observation* grew out of the belief that a thorough understanding of perceptual drawing is fundamental to artistic self-awareness.

As a practicing artist, I understand and vigorously defend the pre-eminence of freedom in an art-making environment. However, as a teacher of art, I have come to understand the parallel importance of discipline, visual sensitivity, patience, eye/hand coordination, a rigorous work ethic, and a solid conceptual base as the essential tools needed to take full advantage of one’s freedom.

This book systematically shows students how to develop their ability to accurately render what they see. Numerous drawings and diagrams support the verbal explanations. Students who complete the entire text will have gained a solid foundation for more advanced work.
Heighened sensitivity . . . . 1
Purposeful awareness . . . . 2
Energized markmaking . . . . 3
Visualization . . . . . . . . . 4
Kinesthetic sensitivity . . . . 5
Physical sensations . . . . . 6

Sensitivity to the touch of the drawing tool to the drawing surface and the ability to discriminate subtle changes in the marks as the tool is "drawn" over the surface are the most important components of the drawing process. These are very basic sensitivities but ones that, because of the refinement and energy they require, are both sophisticated and challenging. It is challenging to invest extraordinary concentration in an activity that is generally perceived as utilitarian. Focusing attention on something as routine as using a hand-held tool to make marks on paper requires that you temporarily detach yourself from the distractions of your overly stimulating environment and devote our attention to the simple experience of direct sensory awareness. Drawing demands an active and purposeful participation like that which is alluded to in the timeless Roman admonition carpe diem (seize the day). This phrase is a concise exhortation to actively explore, experience, and embrace each unfolding moment. Such focused concentration on immediate experience lies at the
CHAPTER 1: GETTING STARTED

very heart of the drawing process. It also alludes to parallels between the act of drawing and the life-affirming tenets of Zen philosophy. Both Zen and drawing are all about fresh and direct seeing. They also share in the understanding that beauty and wonder are accessible through simple and routine activities, if and when you care for and identify with what it is that you are doing. Drawing, like Zen, is active, engaged, and purposeful awareness.

Drawing relies on heightened sensitivity toward tactile and visual experience in ways that are simple and routine. It is important that you understand from the outset that the effectiveness of a drawing is, first and foremost, determined by the richness and variety of the marks from which it is made. Awareness of sensitivity to, and control over the mark making characteristics of the drawing tool and the surface texture of the paper are what determine the vitality of a drawing. The amount of visual interest generated by a drawing depends primarily on the energy, clarity, variation, rhythm, and immediacy of its constituent marks. Marks first make meaning by preserving, documenting, and communicating the sensory experience of the act of drawing itself. The very first level of content in a drawing is always in the marks themselves.

THE FLOWER SERMON

The story goes that Siddartha Gautama, alias the Buddha, decided to use a prop, a Zen tool, for one of his sermons. Having gone up on a hillside to preach, he silently held up a lotus flower. Everyone in the crowd below awaited his words. Everyone, that is, except one person, Kashyapa. Kashyapa smiled. He had caught on to something. Gautama walked down to the smiling Kashyapa, handed him the flower, and conferred upon him the honor, the power, and the task of being the first Zen patriarch.

Ron Di Santo and Tom Steele
Guidebook to Zen and the Art of Motorcycle Maintenance

"Art without life is a poor affair."
Henry James

CHAPTER 1: GETTING STARTED

Sensitivity to sensory stimulation is an excellent first test to determine whether an organism is vital or necrotic (lifeless). Healthy cells react to stimulation; necrotic cells do not. Your quotient of being alive, then, is in large measure proportional to your receptivity and responsiveness to sensory stimulation. These two indicators of vitality serve to reflect the fullness with which you experiences life. They are also essential elements in our current drawing investigation. Line variation is capable of mimicking the fluctuating energy found in biological life. Like the constantly changing "blips" on an oscilloscope that is monitoring the vital signs of a patient (Fig. 1.1), a line that switches from thick to thin, light to dark, angular to flowing, rough edges to smooth provides a perceptual spark that energizes a sensitively rendered drawing. The physical energy that produces a drawing is recorded and crystallized within the marks of the drawing. Once completed, the marks become vehicles through which the responsive viewer reconstitutes a real time experience of the movement, energy, rhythm, character, and "feel" of the original drawing experience.

The previous references to sensations of movement, energy, and rhythm that can be found in a drawing are more than metaphor.
CHAPTER 2: MATERIALS

F to the hard range, with 10H being the hardest and lightest. With these pencils, as with most drawing tools, there is considerable variation in handling characteristics from one manufacturer to another. Graphite also comes in solid, unwrapped, rectangular sticks, in “woodless” cylindrical pencils, and in powdered form that can be rubbed directly onto the drawing surface (Fig. 2.2).

Conté crayons were also invented by Nicholas Conté and are made by compressing a pigment and gum binder paste into small rectangular sticks. These crayons come in black, white, gray, reddish-orange, dark brown, and a dark reddish-brown and are available in HB (hard), B (medium), and 2B (soft). The Conté crayon is a very smooth and versatile tool.

Paper comes in a wide variety of sizes, weights, and surfaces. It’s made from cellulose fibers from either cotton or wood. Rag paper, made from cotton fibers, is the most durable and versatile and is the most permanent paper when used with non-acidic drawing tools and kept from chemical pollution. Papers made from wood pulp are less expensive and can have excellent permanency ratings if chemically treated during manufacture. Newsprint, the least expensive paper, is made from untreated wood pulp and is highly impermanent. Its price and its surface make it a good paper to use when you are starting out but you must remember that the acids in the fibers cause the paper to yellow and deteriorate fairly quickly when it is exposed to light and air. Newsprint has a warm gray tone and can be smooth or moderately rough.

The weight of a paper refers to the measured weight of five hundred (a ream) 17 by 22 inch sheets of a particular paper (Fig. 2.3). It can vary from thirteen pounds (lightweight ink jet paper) to four hundred pounds (heavy watercolor paper).

The surface of the paper can range from very smooth to extremely rough with a full range in between. Tooth is the surface feel of paper. The more tooth a paper has the rougher it feels to the touch. Some inks may adhere poorly to papers with very little tooth. A pronounced tooth is the preferred surface texture for charcoal and pastel art. Cold pressed papers, the most common, have moderate surface texture and absorbency and accept the widest range of media. Rough paper has a pronounced surface texture and is most commonly used with watercolor or ink washes. Hot pressed papers are hard and smooth and best suited to...
other’s characteristics. The “line” and “flow” of the dancer and the “rhythm” and “movement” of a line are the most obvious examples of this intimate interrelationship (Fig. 3.1). Among dancers the value and importance of stamina, muscle tone, and proper technique are clearly understood, but among those who draw these elements are all too frequently overlooked. Drawing, too, demands good posture, a flexible and energized stance, and a high level of physical involvement.

Standing at an easel while drawing is the best position for the exercises that are outlined in this text. Standing promotes a higher level of energy than sitting. Standing promotes physical tension, a slight but meaningful level of discomfort and muscular involvement that helps focus the mind and eye on the activity at hand. Physical activity has recently been given much attention as a method for increasing the attentiveness, energy, and productivity of workers in factories and corporations. It is equally effective for increasing the intensity of a drawing experience. When you stand, you involve your entire body. This position promotes sensory alertness and physical responsiveness. “Drawing” is based on movement, and if you are too tired to tolerate the physical requirements of drawing, it is possible that you are too tired to maintain the intensity that is required for heightened tactile and visual sensitivity.

Standing also makes it more likely that you will periodically back away from your drawing (Fig. 3.2). This simple change of relative position enables you to look at and evaluate your drawing with a surprisingly fresh eye. Moving back several feet from your drawing not only is an energizing physical activity but also counteracts the eye’s natural tendency to become complacent and less discriminating when exposed to an unchanging image over a
CHAPTER 3: MECHANICS

3.16 Excavation by Willem de Kooning displays a powerful combination of highly varied dark marks surrounding lighter shapes. His lines move from thick to thin, angular to curved, and dark to light.

drawing the appearance of anything recognizable (Fig. 3.16). Focus all your attention on maximizing the variation of the line as you move the tool. Try straight lines, sweeping curves, large circles, and small meandering squiggles. Constantly vary the pressure and rotate the tip. Remember, sensitivity to line is the single most important element in drawing.

CHAPTER 4 INTUITIVE GESTURE

Drawing from observation doesn’t require you to change the way you see, but it does require you to alter the way you think about what you see. Paradoxically, this means that when you are drawing, you must not think about what you see. Look now, feel now, think later. Let me explain.

Rational thinking is characterized by a preponderance of preconceived ideas and a heavy reliance on language. Rational thinking is an essential and valuable component of our brain’s ability to make sense of countless aspects of our lives, not the least of which is helping us interpret our visual environment. However, when you draw from observation, relying heavily on rational thinking obscures and distorts your visual perceptions because doing so substitutes preconceived, generalized mental constructs for specific and concrete sensory data. When you rationalize your perceptions with preconceived ideas what you think becomes more important than what you see and the clarity of your direct visual perceptions becomes severely compromised.
CHAPTER 4: INTUITIVE GESTURE

To safeguard the accuracy of your perceptions you will need to temporarily suspend the rationalizing influence of analytical information processing in order to allow your intuitive, spatial awareness to react directly to the visual information in your visual field. A straightforward illustration of how the differences between these two cognitive styles affects the appearance of an object in a drawing is presented in Figs. 4.1-4.3. In Fig. 4.1, the drawing of the coffee mug is based on general ideas regularly associated with any coffee mug. This is a conceptual drawing. It is a logical construction that uses clear stylized symbols to represent our most basic understanding of a coffee cup. This conceptual drawing is a straightforward, informative, and highly intelligent drawing. It includes the circular opening out of which we drink the coffee, the flat bottom upon which the cup sits securely, the parallel sides that connect the circular top to the flat bottom, and the curved handle that is attached to the side. This image contains general ideas that relate to most coffee mugs. However, this drawing makes no attempt to tell us how our very own personal coffee mug appears on the table in the morning. Fig. 4.2, on the other hand, depicts the appearance of a specific coffee mug seen from a unique viewing posi-

TYPES OF INTELLIGENCE

Language skills
Math/logic skills
Analytic reasoning
Short and/or Long term memory
Pattern recognition
Body awareness and coordination
Spatial awareness
Sound discrimination
Rhythm/time sensitivity
Interpersonal skills
Sensitivity to nature
Artistic sensitivity
Intuitive problem solving

concept n.
1. A general idea derived or inferred from specific instances or occurrences.
2. Something formed in the mind; a thought or notion.

percept n.
1. The object of perception.
2. A mental impression of something perceived by the senses, viewed as the basic component in the formation of concepts; a sense datum.

CHAPTER 4: INTUITIVE GESTURE

A conceptual drawing emphasizes what we “know” about a coffee mug.

A perceptual drawing records information directly from our observations.

This combination drawing has a certain naïve charm but no integrity because it mixes the conceptual approach with the perceptual.
4.5a-d In its earliest stages, an intuitive gesture is primarily concerned with establishing a graphic notation that suggests the “where” and the “how big” of each of the visual elements. It is important to jump quickly from one element to another in order to develop all areas of the gesture simultaneously. It is helpful to gesture very lightly and delicately for the first three to five minutes of the drawing.

4.5e-h The less specific the reference to shape or surface detail of the objects, the easier it will be to make any necessary adjustment to their size and placement. When the gestural notation becomes an enclosed, recognizable shape, we tend to encounter psychological resistance to altering it. Only after you are satisfied with the size and placement of your estimations should you begin adding specific detail to the objects.
CHAPTER 4: INTUITIVE GESTURE

When you apply rational information processing to your perceptions, you are relying on sequential analysis of the constituent parts of the objects, but this logical approach generally doesn’t allow you to see the big picture. You ‘can’t see the forest for the trees.’ In other words, rational processing reacts to the separateness of objects more than to their interrelatedness. To grasp the big picture you must react intuitively and ignore details. Suspending rational processing when you begin a drawing demands mental toughness. The greater your tolerance for working through the predictable frustration that inevitably arises during this rapid, nonlinear, gestural estimate of the size and placement of the overall “whereness” of things, the greater will be your ability to resist falling back on the familiarity of symbolic, conceptual, rationalized representations.

An intuitive gesture is not a drawing of objects, it’s a flexible search for information about the placement, size, and relative proportion of ‘where things are’ and of ‘where things aren’t.’ Specific edges, shapes, and/or detailed information of any sort during the first three to five minutes is usually an indication that you have fallen back on a rational cognitive style and that you are not giving your sensuous Ge-stalt n. a form or configuration having properties that cannot be derived by the summation of its component parts.

4.6 Albert Giacometti, Studio with a man on the right and three women. Private Collection. As can be seen in this drawing of the artist’s studio by Giacometti, in an intuitive gesture drawing the emphasis is on line sensitivity and a rapid estimation of the relative position of the “whereness” of things as opposed to enclosed shapes and detailed renderings.

“The only occasion when the eye moves steadily and smoothly is when it is following a moving target.”

Howard S. Hoffman

intuition the free reign it deserves in determining big picture spatial relationships (Fig. 4.6).

To encourage intuitive spatial processing it is recommended that you apply an exceptionally light touch with the drawing tool. This allows for a considerable amount of gesturing without clogging up the drawing surface. In fact, it can be helpful to start the intuitive gesture without even touching the paper. “Stealth” movement around the drawing surface allows you to consider size and placement information before making any marks at all. When the pencil eventually does make physical contact, it should initially leave only the faintest notations of approximate placement, relative size, and estimations about the distance between the objects. The pencil should skim lightly and rapidly across the surface, constantly fitting from one area to another, imitating as it goes the spontaneous, nonlinear, nonsequential and impulsive movements of your eyes (Fig. 4.7a-b). These quick, darting movements that occur as the eye scans a visual field are necessary because the fovea (a tiny region in the back of the eye that is packed with rods) can only register about 2% of your visual field in sharply focused detail. Incredibly, this means that even though our field of vision extends
CHAPTER 5: INTUITIVE PERSPECTIVE

that you apply the straight-edged clock-angle tool (Fig. 5.2a-c) The clock-angle tool, when held at arms length and perpendicular to your line of sight, is capable of capturing the angular tilt of any receding line or edge of a rectilinear object in your visual field. When applied carefully the clock-angle tool contributes to a solid approximation of linear perspective (also called optical, scientific, or Renaissance perspective). Although we will be addressing the mechanics, history, and underlying conceptual framework of linear perspective in Chapters 14, 15, 16, those technical and theoretical underpinnings are not, in all honesty, as critical to the actual making of an accurate representational drawing as is your ability to respond directly to your visual perceptions. The clock-angle tool focuses your attention directly on your visual perceptions. Holding the straight edge perpendicular to your line of sight and then rotating it until it is aligned with a receding edge reveals the apparent tilt of the edge to which it is applied. When the clock angle tool is applied in combination with intuitive gesture you are able to produce surprisingly effective depictions of three-dimensional spatial recession on a two-dimensional drawing surface. Look now, think later.

5.2a-c Any straight edge that is easy to hold and is at least 4" in length works well as a clock-angle tool. It is important to keep the clock-angle tool perpendicular to your line of sight when you are aligning the tool with the edge whose angular tilt you intend to capture.

5.3a-b To keep your straight-edged clock-angle tool perpendicular to your line of sight it is helpful to imagine a floating analog clock face centered on an end point of the edge whose tilt you wish to determine. The clock-angle tool then becomes the “minute hand” of this imagined clock.

A clock-angle tool gets its name from the fact that it can be used in combination with an imaginary, analog clock face understood to be floating perpendicularly to your line of sight (Fig. 5.3a-b). To take full advantage of the clock-angle tool extend your arm fully toward the object and rotate your clock-angle tool until it is perfectly aligned with the receding edge you wish to analyze. For the tool to work, you need to keep the straight-edged tool in the same plane as that of the imagined clock face, perpendicular to your line of sight. Aligned this way the straight edge not only duplicates the angle of the receding edge but also mimics the position of what would be the minute-hand on your imag-
CHAPTER 6  POSITIVE/NEGATIVE SHAPE

5.14 We reinforce the illusion of three-dimensional space by varying the thickness and contrast of lines as they move into the distance. This is known as atmospheric perspective. It is based on the perceptual principle that objects nearer the observer appear more focused and in greater contrast to the background than those further away.

The clock-angle straight-edge is a most valuable addition to our observational drawing tool kit. Although a more formal presentation of the underlying principles and mechanics of linear perspective will be presented in Chapters 14, 15, and 16, the basic mechanics of the clock-angle tool are all you need to capture highly accurate estimates of angular recession of lines and/or planes in perspective so that they appear to exist in coherent and unified space. When intuitive gesture, sensitive contour line variation and exaggerated atmospheric perspective are combined with intuitive perspective (the clock-angle tool), the illusion of three-dimensional recession is enhanced (Figs. 5.14, 5.15).

5.15 Sensitive contour line variations and exaggerated atmospheric perspective can be used to effectively communicate spatial depth in a drawing.

6.1 The black figure above can be distinguished from the (back)ground by the ease of its identification and by the specificity of the names that we can attach to it.

It has been suggested that our survival as a species is, in large measure, dependent on our ability to recognize and identify meaningful shapes in our surroundings. We are the descendants of individuals whose visual sensitivity enabled them to escape the saber-toothed tiger while there was still time, of sharp-eyed gathers who could spot food when it was scarce, and more recently of agile pedestrians who made it across busy streets before the cars came speeding by. This long chain of biological survival has programmed our eye and brain to assign particular importance to self-contained shape because there is a distinct evolutionary advantage in being able to identify objects (tigers, fruit, automobiles, etc.). Identifying these shapes depends on your ability to distinguish them from their surroundings.

Traditionally, we refer to the identifiable shape as the figure and the surrounding area as the (back)ground (Fig. 6.1). A figure generally attracts more attention than the (back)ground and is said to carry more visual "weight" than the surrounding...
7.1 The Egyptian symbol for life (ankh), the almond shaped symbol of the Universal Mother (Vesica Piscis), the Greek pentangle of good omen (Pythagorean star), the Christian Crucifix, the interlocking triangles forming a six pointed star (Star of David), and the astronomical (and astrological) symbol for the planet Earth, the Cross of the Zodiac, are all organized in accordance with the x/y grid that serves as the perceptual baseline of our visual experience.

Logical symbol for the Earth (Fig. 7.1). These symbols reflect the ordered cosmic world-view of our ancient ancestors. Each design, either explicitly or implicitly, utilizes the vertical and horizontal perceptual grid as the foundation of its pictorial organization. This shared underlying structure probably tells us as much about the importance our cultural ancestors attached to the x/y axes as it does about the specific beliefs of any of these venerable traditions.

Our spatial sensitivity to the x/y axes can easily and effectively be transformed into an observational drawing tool. By once again taking a straight-edged object and this time aligning it to the x or y axis, and then holding it in front of objects in your visual field the straight-edge becomes the basis of comparison for identifying both the x or y axial relationships. In 7.2 In his Homage to Piet Mondrian the author attempted to capture the pictorial order and compositional equilibrium that distinguish Mondrian’s paintings. His compositions were derived from the study of ancient wisdom and sacred symbols. Because x/y axis relationships dominate his compositions your straight-edge used to establish the perceptual grid will be referred to as a ‘Mondrian’ Tool.

7.3a-b Any easily held straight-edged tool - pencil, ruler, stick, etc. - that is at least four inches in length can be used as a Mondrian tool. To function properly it must be held so that the straight-edge is perpendicular to your line of sight.

7.4 The Mondrian tool, a straight-edge aligned to either the vertical or horizontal axis that is held perpendicular to your line of sight, serves as a moveable x/y axes grid that can be projected onto both your field of vision and the surface of your drawing. Establish your x/y orientations while looking straight out in front of you (towards what would normally be the horizon) before carefully moving it to check alignments in either your visual field or your drawing.

Homage to the modernist painter Piet Mondrian, whose paintings are structured around the x/y axes, we will refer to our straight edge as the Mondrian tool (Fig. 7.2). The Mondrian tool serves as a moveable x/y axes grid that can be projected onto both your field of vision and the surface of your drawing (Fig. 7.3a-b). It works best when held perpendicular to your line of sight (parallel to your picture plane) with your arm fully extended (Fig. 7.4). This tool provides a surprisingly simple yet effective way to collect important visual information about the placement, size, shape, and even the proportion of objects in your visual field and allows you to accurately transfer that information to your drawing. By applying
5.14 In 1435, in his treatise on painting (De Pictura), Leon Battista Alberti discussed the construction of a simple tool for the direct transcription of objects as they appear to the eye. He suggested weaving thread in a network of parallel squares on a wooden frame. By viewing objects through this "intersection" from a fixed viewing position, the arrangement of forms in space can be duplicated on a drawing surface that is divided into similar squares. Leonardo, Raphael, and Albrecht Dürer, along with countless other artists, designed similar mechanical drawing devices to study nature. Leonardo is on record, however, as having been critical of those who could not draw without this type of mechanical assistance. Today photography and digital imaging have replaced Alberti’s "veil" as the artists’ preferred tools for gathering visual information. Meanwhile, the debate about whether mechanical imitation leads to aesthetic and intellectual barrenness continues unabated.

5.15a-b Alberti’s proposed mechanical drawing device is too impractical for most artists but his description remains an effective model for visualizing how the picture plane functions. The two images in this illustration depict the imaginary window through which the observer is viewing several objects from a fixed viewing position. In these illustrations the white dots represent those points where the line of sight intersects the imaginary picture plane. As the line of sight shifts further back in space, the progressive depth appears as movement up, higher on the picture plane. For the majority of drawings this relationship holds true but when the line of sight goes above eye-level, objects higher on the picture plane are closer.

5.16 In an extended gesture drawing (a half-hour or more) keeping each object within the borders of the page is an excellent way to become more sensitive to the "big picture" relationships. This restriction forces you to work directly and flexibly while determining the maximum size that still allows everything to fit on the page.

picture plane n.
1. The actual flat surface, or opaque plane, on which an artist draws
2. An imaginary transparent "window" that the observer superimposes over the subjects being drawn and/or the imaginary transparent "window" through which one looks when experiencing illusionistic space

When you combine the perceptual grid with an intuitive overview of complex relationships in space (intuitive gesture), an intuitive perspective, and positive/negative shape sensitivity in an extended gesture of twenty minutes or more, you have at your disposal all that is necessary to capture complex spatial relationships (Fig. 15.16). Your drawing needn’t be detailed or "finished" to be successful. It need only be an energetic overview of
5.17 An extended gesture drawing has multiple levels of content. With the help of the perceptual grid an extended gesture reinforces your intuitive estimates of the relative size of each object, the location of each object in relation to the others as well as revealing the location of specific visual characteristics of the objects themselves. Sensitive tying this spatial analysis together is line variation.

5.18a-b Starting with an intuitive gesture provides the "big picture" sensitivity that enables you to properly estimate the size of the objects so that everything fits on the page. We will discuss compositional dynamics in Chapter 17 that often include intentionally allowing objects go off the edges, but for now it will increase your spatial sensitivity to work at keeping it all on the page.

5.19 If you generously apply perceptual grid lines, clock-angles, positive/negative shape correspondence, and the proportion tool at each and every stage of an extended gesture drawing you will gradually fine-tune your initial intuitive estimates and arrive at surprisingly accurate depictions of sophisticated spatial relationships.

5.20 An extended gesture of the relation of forms in space is open to continual adjustment.

The relation of forms in space and remain fluid, flexible, and open to continual adjustment (Figs. 5.17, 5.18a-b, 5.19, 15.20). It should be evident from the student drawings reproduced in this chapter that convincing illusions of objects in space can be captured in a drawing through a rigorous application of these surprisingly simple yet effective techniques (Fig. 5.21)
CHAPTER 8: PROPORTION

comparison, but it doesn’t matter whether you choose the smaller or larger dimension as the basis of the comparison because the proportion will be the same either way. As you can see in the following illustrations, if you start with a still life and choose the larger dimension as the basis of comparison (Fig. 8.6a-b), the proportion is one unit (three thirds) in width and two thirds (of one unit) in height. If, on the other hand, you begin with the smaller dimension (Fig. 8.7a-b), the proportion is expressed as one unit (two halves) in height and three halves (of one unit) in width. The change in the base unit of measurement in these two comparisons changes only the numerical labels for each relationship but the proportion for the two procedures actually proves to be identical. The numerical difference reflects the order of the comparison. Different numbers but identical proportion because they are inverse proportions. A defining characteristic of an inverse proportion is that they are the same proportion turned upside down and will always equal one when multiplied together. The product from multiplying one over two-thirds by one over one and one-half is one. This means that one proportion is the inverse (upside down) version of the other.

8.6a-b It can be helpful during the early stages of a gesture to check the overall proportion of everything you are drawing. To do this you will need to imagine a rectangle that defines the extreme edges of the object(s) being observed. If using a ruler, you must ignore any measured increments that may appear on the ruler. Rely instead on the idea that the length of the initial measurement is always equal to one unit.

8.7a-b If you use the smaller dimension as the basic unit of measure, you will have to reduce the length of the exposed portion of the proportion tool so that it matches the smaller dimension (top). With the new base unit of measure, carefully rotate the proportion tool. Be sure to keep the tool at a constant distance from your eye and perpendicular to your line of sight. Once rotated you can accurately compare the basic unit (overall height) to the overall width of the still life.

When calculating the overall proportion of an individual object (comparing its apparent width with its apparent height), it is important to keep in mind several factors: the geometric character of that object (cylinder, rectilinear solid, etc.), the object’s orientation in space, and the object’s position in the visual field relative to the viewer. Each can cause the observed proportion to appear quite different from what you would expect based on your conceptual knowledge of that object. In other words, the object’s proportions that we know are frequently not the proportions that we see. Whereas our reliance on rational information processing in our daily routines can be quite helpful in making sense of our visual world, if we want to draw objects as they actually appear, we must, once again, not allow our logical mind to substitute rational thinking about an object for our direct sensory perceptions of that object. To prevent your concepts from distorting your perceptions you must record the proportion you see, not the proportion you know. Frequent application of the proportion tool will go a long way in safeguarding accurate perceived proportions.
CHAPTER 8: PROPORTION

The apparent proportional consistency of an upright narrow cylinder does not apply when the cylinder's diameter approaches or exceeds its height, when it is tilting away from the observer, or when it is resting on its side and receding back into space (Figs. 8.10, 8.11, 8.12). In these three cases there is substantial difference between the perceived and the physical proportion.

8.10 Cylinders that are wider than they are high and are sitting flush with the ground plane undergo considerable change in apparent proportion when they move toward or away from the viewer. The furthest roll of masking tape appears nearly three times as wide as it is tall whereas the roll nearest the viewer appears a little over two times as wide as it is tall.

8.11 The apparent overall proportion of a cylinder that is wider than it is high and is standing on its side will vary considerably depending on its degree of rotation.

8.12 Cylinders also appear as having greatly varying proportions when they tilt back away from the observer’s picture plane. Here a bottle of painting medium appears 4/3 of its upright height when leaning back at a 45° angle and 2/3 of its upright height when leaning back at about a 60° angle.

As we continue our discussion of proportion it is worth repeating that when calculating the apparent perceptual internal proportion of an object, the actual physical size of the object is irrelevant. Objects of vastly different physical sizes can frequently share identical proportions. Whether or not two objects share identical proportion is based solely on whether the size relationship between their various internal dimensions is the same (Fig. 8.13).

8.13 The two bottles above are of identical physical proportions. The smaller of the two, however, appears ever so slightly elongated in its height (thereby slightly altering its apparent internal proportions) because its ellipse near its top is slightly less compressed due to its lower vertical position relative to the observer’s eye level.

Doors and windows make particularly good subjects for proportion studies. When looked at squarely from the front (a 90° angle formed by the viewer’s line of sight and the surface of the object), they have a height-width
worth noting that there are other ancient monuments that seem to anticipate the Greek fascination with a chariot as a vehicle for exploring the riddle of the cosmos.

Diodorus, a Greek historian of the 1st century BCE, wrote about a race of people who lived in the north beyond the Pillars of Hercules (Strait of Gibraltar) who had constructed a temple to the sun god Apollo. These people lived in the land of the cold north wind (Boreas), and Diodorus referred to them as Hyperboreans. It is believed that he was referring to the people living in what we now call the British Isles. Curiously, there are numerous earthen, wooden, and stone monuments in Britain whose internal alignments suggest that they were designed to function as astronomical observatories with major emphasis being placed on the movement of the sun (Apollo). The best known of these monuments, Stonehenge, was built on the Salisbury Plain in England between 3100 and 1900 BCE. Gerald S. Hawkins, an early archeo/astronomer, calculated that twenty-two of Stonehenge’s possible viewing sites aligned thirty-two times with fifteen of eighteen unique positions of the sun and moon. The likelihood of such correlations being coincidental has been calculated to be one hundred million to one.

“9.5a-b This aerial photo shows Stonehenge with an overlay of a Golden Rectangle that precisely connects four distinctive points on the inside edge of the circular earthen mound that was completed during the earliest stage of the monument’s construction circa 3100 BCE.

“9.6 In the top image the circle of large gray sandstones surrounding the larger horseshoe of trilithons that stand at the center of Stonehenge are depicted as they would have looked shortly after having been installed nearly four thousand years ago. The stone circle and horseshoe are arranged so that the relative positions of these two distinctive formations create the unique proportion that is self-generating to infinity, the Golden Mean. At a time when the heavens were understood to be the realm of the divine, it is not much of a stretch to speculate that Stonehenge was designed as a mechanism for funnelling the celestial infinite into the realm of space and time.”

Black Elk
Medicine Man
Oglala Sioux

As we entertain the assumption that Stonehenge was built to funnel celestial order into the lives of the Hyperboreans, it becomes of great interest to note that the first and third stages of the monument’s design are laid out in strict accordance with the proportion of the Golden Mean. The fact that what is believed to be the central astronomical alignment of this monument - the sighting of the rising sun as it moves across the tip of the “heel” stone on the Winter Solstice, intersects its underlying Golden Rectangle at a 90° angle - lends support to the hypothesis that its designers were not only skillful and sophisticated astronomers but active participants in the tradition of sacred geometry as well (Figs. 9.5a-b, 9.6). Although we do not know who was responsible for the design and construction of Stonehenge, the monument itself provides a challenging glimpse into the complexity of the minds of the amazing individuals who planned and built it. As with the Great Pyramid, this combination of astronomical precision and mystical geometry coexist in what has proven to be one of the most powerful and intriguing visual messages from the distant past.
CHAPTER 9: THE GOLDEN MEAN

the ideas of Pythagoras, Plato, and Polycritus, he goes on to add that the human body is beautiful because its proportions are the expression of the order of the universe.

The tradition of using the Golden Mean in sacred buildings does not end with the fall of the Roman Empire but continues on in the ecclesiastical architecture of the Christian church (Fig. 9.13a-b). There is very little specific information that documents the beliefs surrounding the use of a sacred geometry in the Early Christian period, but there are colorful tales of a secret brotherhood of architects and stonemasons preserving mysterious ancient wisdom. Secret brotherhoods are difficult to verify but it can be argued that the present-day Order of Freemasonry was at one time just this sort of secret organization. Even though Freemasonry is not directly affiliated with either Christianity or Judaism, its oral tradition claims it to have descended directly from a Phoenician architect named Hiram, who is thought by the Freemasons to have designed the Temple of Solomon. Regardless of the role of the Secret Brotherhood of Masons during the Middle Ages, it is clear that the Golden Mean appears countless times throughout medieval church architecture.

9.13a-b Hagia Sophia (top) in Istanbul (sixth century) and St. Mark’s Cathedral in Venice (twelfth century) are examples of the widespread use of the Golden Mean as a template for establishing the proportions for ecclesiastical architecture. The gender in the name, Hagia Sophia, hints at a reference to the ancient Greek goddess of sacred wisdom.

THE FIBONACCI SEQUENCE

Leonardo Bigollo da Pisa (Fibonacci) was born in Italy in 1179. Fibonacci was the most renowned mathematician of the Middle Ages. In 1202, after returning from Egypt, he published Liber Abaci, the book that introduced Hindu-Arabic numbers to Western Europe. Even though the ancient Greeks had constructed Golden Sections and Rectangles with straight-edges and compasses, they could not describe them numerically because they had not adopted a Hindu-Arabic numbering system. Despite the profound importance of Fibonacci’s contribution to the development of Western science and technology, he is actually more widely known for a curious series of numbers that were generated when answering a riddle concerning the number of ancestors of a male bee going back twelve generations (HINT: male bees emerge from eggs that have not been fertilized, whereas fertilized eggs produce females). He constructed this riddle to encourage people to practice using the new numbers. The number of bees in each of the generations formed the beginning of an infinite summation series where each succeeding number in the series is the sum of the preceding two. Although he was most likely unaware of the mathematical implications of this progression (to be discussed later), it is still primarily referred to as the Fibonacci Sequence:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233...

The term, Renaissance, literally means “rebirth.” It is used in reference to the re-introduction of classical Greek and Roman art and ideas into the culture of the Italian peninsula. The Renaissance began in the 13th and 14th century, gaining considerable momentum in the 15th century and culminating in what is often described as the High Renaissance in the early 16th century. Many of the intellectual traditions that had driven the
number of instances, the subject matter is so well integrated with the implied spiritual aspects of the geometry that it is certainly reasonable to propose that an understanding of the hermetic tradition was still alive and well. It was during this century that the Brotherhood of Freemasons first publicly announced its existence with the opening of the London Grand Lodge (1717). The guiding principles of this secretive society were rooted in liberty, equality, brotherhood, and the nobility of man (Fig. 9.17). As the century unfolded, Freemasons were among the leaders who initiated sweeping social and political transformations that forever changed the face of western society. Some have gone so far as to suggest that the American Revolution was a Masonic experiment in ideas of government that were, in turn, rooted in ancient mystical traditions. Whether or not there is any substance to this particular claim, it is easy to verify the fact that freemasons were prominent in the Revolution and made critical contributions. Among the most important of these were George Washington, John Hancock, John Marshall, Baron Von Steuben, the Marquis de Lafayette, and (for the conspiracy theorists among us) all of the British generals. Not only did St. Andrew’s Masonic Lodge play an important role in the Boston Tea Party at the start of the conflict, but the very first oath of office was administered to a Freemason (George Washington) by a Masonic Grand Master on a bible from St. John’s Masonic Lodge #1 of New York. Even though there is no direct evidence that Thomas Jefferson, the primary author of the Constitution, was a Mason, he was trained as a neoclassical architect. It is also curious to note that the reverse side of the dollar bill contains multiple hidden references to the belief in the edifying character of sacred geometry (Figs. 9.18, 9.19a-b). Growing interest in the revolutionary principles of liberty, equality, and brotherhood soon contributed to sweeping social and political transformations in France, South America, Texas, and Mexico. The fact that Freemasons again played crucial roles in each of these revolutions lends credibility to the notion that they were in fact an outgrowth of ancient spiritual traditions. Prominent Masons among them were Simon de Bolivar, Jose de San Martin, Benito Juarez, and Sam Houston.

The use of the Golden Mean in 19th century art continued uninterrupted as a tool for arranging compositions but integration of the pictorial content with a spiritual sensibility seems to have been compromised by an overriding preoccupation with opulence.
CHAPTER 9: THE GOLDEN MEAN

the erotic, and exaggerated theatricality (Fig. 9.20). Hawkish sentimentality and exaggerated emotionalism replaced commitment to enduring and universal values. Curiously, just as this shift toward theatricality began to dominate the official art of the period, natural science began to record observations and collect data that can be interpreted as corroborating ancient mystical speculation. Once botanists found that sunflowers grew in accordance with $\phi$, it was not long before scientists discovered the same proportion was subtly disguised in a seemingly endless variety within the visible structure of living organisms. Plants, seashells, insects, birds, reptiles, fish, and mammals were all found to share a growth pattern that

9.20 Jean-Dominique Ingres, La Grande Odalisque (1814, The Louvre, Paris). The erotic opulence and theatricality of neoclassical artworks of the nineteenth century overshadowed the mystical significance of the Golden Mean in spite of the fact that it was still customary to incorporate its geometry into the compositional arrangements. La Grande Odalisque forges its spiritual clarity because of a material fascination with the erotic sensuality of the Middle Eastern harem.

9.22a-b The Spiral Chambered Nautilus is the most commonly reproduced image used to illustrate the Golden Mean in nature. It appears in hundreds of books and on tens of thousands of web sites devoted to the topic of Sacred Geometry. Unfortunately, however, as beautiful as is the unfolding of the Chambered Nautilus it does not unfold with the proportion of a Golden Mean spiral.

9.23 Georges Seurat, La Parade (The Sideshow). (1887-1888, Metropolitan Museum, NYC). A schematic overlay has been added by the author illustrating one of several schemata used to organize important elements of the composition in accordance with the Golden Mean. This ancient proportion appears with surprising regularity in works of those 19th and 20th century artists who are credited with rediscovering the integrity and clarity that had been the hallmark of Egyptian, ancient Greek, and Renaissance art. These artists include Monet, Van Gogh, Cezanne, and Seurat.

reflects the presence of a universal harmony (Fig. 9.21, 9.22a-b). Perhaps in response to the discoveries being made by science or perhaps in response to a general increase in interest in spirituality in the latter half of the 19th century artists, began to challenge the theatrical superficiality that had become so popular. These artists not only utilized $\phi$ as a compositional formula but made a conscious return to a simpler, yet more profound understanding of the Golden Mean’s mystical resonance (Fig. 9.23).

This chapter is certainly not meant to encourage irrational beliefs in New Age superstitions. New Age movements offer answers whereas the Golden Mean tradition raises only aesthetic, scientific, and non-dogmatic spiritual questions. It is part of our cul-
10.18 Because the curls that were introduced into the flag actually made the back end wider than the front the convergence of the edges that ordinarily occurs when a rectangular plane recedes does not take place. As a result, the rear end of the flag seems to come forward slightly. However, the drawing succeeds at creating an effective illusion of form in space by the presence of many other spatial cues; sensitivity to proportion, using the Mondrian tool to align important transitions in the flag, exaggerating the reduction of width of the stripes that are further back in space, exaggerating atmospheric perspective, consistent application of chiaroscuro so that the flag appears to be illuminated from above, strategic use of overlap, and sensitive contour line variation.

because light becomes diffused as it passes through water particles that are suspended in the air. The distance of the objects from the observer and the amount of moisture content in the air directly effect how clearly we can see. We are all somewhat familiar with this

10.19a-b Reducing the contrast of an object with its background as it recedes in space is a powerful tool for creating the illusion of spatial recession.

10.20 Katherine Linton-Warren, East Texas, (Graphite on paper, 2005). An illusion of considerable spatial recession is achieved by combining disproportion- ate scale (objects getting smaller as they recede) with an exaggerated reduction of contrast (atmospheric perspective).

perceptual phenomenon because it commonly occurs in nature (mountaintop vistas and foggy mornings) and also because it frequently appears in photographs. What is somewhat less appreciated, though, is how effective it is to add exaggerated atmospheric perspective to a drawing whose content contains limited spatial recession and where there is no atmospheric perspective to be observed. The spatial illusion of objects in a relatively shallow space can be substantially enhanced by purposefully exaggerating the reduction in the contrast in objects as they are understood to be located further back in space. When you are exaggerating atmospheric perspective in this way, it is important to maintain a smooth progression in the reduction of contrast and the reduction of detail.

Arranging the flag so that the cross-contour stripes remain visible across the entire surface of the flag intensifies the spatial illusion. This makes it easier to extract visual logic from the observed changes in size, width, and direction of the cross-contours (Fig. 10.21). There are situations, however, in which it is necessary to draw a flag from a viewing angle where one or more of the cross-contours disappears completely behind a steep curl or fold. When the cross-contours
CHAPTER 10: CROSS-CONTOUR

metric forms. But before moving ahead you might want to attempt the granddaddy of cross-contour assignments: an object that is draped in a striped fabric. For this project you will need a couple of yards of striped fabric (two-inch stripes work best) and an object (to drape it over) that has a clear and strong visual character. As with the flags, an important part of this drawing occurs before you pick up your pencil. The stripes need to be arranged on the chair so that they reveal the visual character of what is underneath. Remember to attach the cloth to the chair in a number of places using tape, thumbtacks, safety pins, or staples. This helps to reveal the structural characteristics under the cloth.

Although the striped chair project is certainly more demanding than a flag drawing, it generally results in extraordinarily sensitive and illusionistic images (Figs. 10.30a–b - 10.32). The only drawback to tackling the striped chair drawing is that it requires at least two full weeks of class time and homework to do it justice. For the students who have taken this challenge, the increased difficulty brings out an intensely focused energy. The results almost always make the effort worthwhile.

10.30a-b The shape of an object can be described in remarkable detail by duplicating the apparent changes in direction and width of a set of parallel stripes that are draped over the form.

10.31 More detail could be added, but this drawing is complete. A drawing is considered complete when it is sensitively constructed and internally consistent.
11.2a-b A cylinder is a solid with a curved side that is bounded by two parallel circles. A sphere is a three-dimensional surface whose points are all equidistant from a fixed point. The fact that these solids share essential characteristics with circles allow you to apply the same fundamental elliptical principles governing the appearance of foreshortened circles to both of them.

Because of the unforgiving regularity of a circle, it is difficult to draw one without using a mechanical tool. Fortunately, unless you are engaged in a study of geometry or making technical diagrams you will rarely need to draw a true circle. This might sound a little surprising given the obvious frequency with which circular forms occur in our environment, but the only time a circular form actually appears to an observer is when it is both parallel with the observer's picture plane and directly in front of her/his eye(s). Any deviation from this singular spatial relationship causes noticeable perceptual distortion in the visual character of the circle. Instead of appearing perfectly round, circles that move up, down, or across the picture plane or those that tilt away from the observer appear visually foreshortened, compressed along one axis. A foreshortened circle that is compressed along one axis looks exactly like an ellipse (Figs. 11.3, 11.4). An ellipse is a smooth and continuous curve that is bilaterally symmetrical around a major and minor axis with the outside edge having no flat spots and no football ends (Fig. 11.5). The amount of axial compression exhibited by a particular fore-

11.3 In the visual world circular objects rarely appear as circles. Most commonly, observed circles appear as ellipses.

11.4 An ellipse is a geometric figure that resembles a circle that has been compressed along a single axis. The longest diameter of the ellipse is called the major axis while the shortest is called the minor axis (above left). An ellipse is bilaterally symmetrical (exact correspondence) on both sides of each axis. Although there will be no need to use the following mechanical device to construct ellipses as we draw, it might be helpful to understand how they are formed. The sum of the two line segments that connect any point on the curve of ellipse with the two foci on the major axis is always the same (above, right). This means that if you attach a length of string longer than the distance between the foci to the two foci and then press a pencil tightly against the stretched string, the string's resistance will determine the curvature of the ellipse.

11.5 The two most common errors that occur when drawing an ellipse as a foreshortened circle are the flattening out of longer curved sides and the substituting pointed ends like the ends of an American football for the fluid curve that actually occurs. Both errors can be eliminated by moving your pencil through a series of continuous, sweeping, and delicate gestures that approach the entire ellipse as a unified and seamless entity.
CHAPTER 11: FOreshorteneD CIRCLES

11.8a-b Even though you probably won’t ever respond quite as inaccurately as is depicted in the manipulated photo above left it is important to recognize how powerful our tendency is to substitute what we know for what we see. The preconceived notion that the mouth of the cup is circular and the bottom is perfectly flat will lead to serious underestimation in the progression of elliptical compression. Preconceived notions certainly had a strong distorting influence on the ancient Roman artist’s rendering of the glass vase (above, right) in Still life with peaches and glass vase, Herculaneum, circa AD 56, Museo Archeologico Nazionale, Naples.

sip/slurp/gulp our breakfast beverage and when we then put the container down onto the tabletop we are confident that its perfectly flat bottom will keep it stable and upright (Fig. 11.8a-b). The intimacy of this daily ritual solidly reinforces practical, analytical thinking about the general characteristics of cylinders that, while being tremendously useful for everyday functioning, are often in serious conflict with the visual appearance of cylindrical objects. To prevent this conceptualization from distorting your perceptions you need to be sensitive to the conflict between “what you know” and “what you see.” By recognizing this difference you will control

11.9 Including lines for both the major and minor axes encourages bilateral symmetry in each ellipse. Drawing a central axis down through the center of the bottle serves to promote lateral symmetry in the larger cylindrical form.

11.10a-b To capture the apparent increased curvature that occurs when foreshortened circles (ellipse) are progressively positioned further away from our eylevel takes a concerted effort to render each foreshortened circle fuller than the one preceding it. The rational tendency that overshates the fullness of ellipses at the top of vessels and simultaneously understates those at the bottom (Figs. 11.9-11.11).

Foreshortened circles that are parallel to the ground plane appear more circular not only when they move away from eye-level in the physical world but also when they move toward the observer. As we saw earlier in the chapters on the perceptual grid, objects that are below eye level appear lower down on the picture plane as they come forward. This apparent vertical movement down the picture plane results in precisely the same change in elliptical proportion as does movement along a vertical axis. Because these two types of movement (up/down, in/out) result in identical elliptical compression, the proportion
CHAPTER 11: FOreshortened Circles

is unavoidable because we are using one approach to describe two substantially different spatial configurations, but even though spatial clarity is always a priority in perceptual drawing, we can tolerate this ambiguity because the subtle loss of spatial consistency is positively offset by an exaggerated illusion of depth. The unintentionally implied curvature of the picture plane helps compensate for the loss of the binocular depth we discussed earlier. On a theoretical level, despite the fact that we have defined the picture plane as conceptually flat, there are those who suggest that it is actually more accurate to think of it as curved because points on the periphery of the picture plane are further from the eye of the observer than those nearer to the center (Figs. 11.21, 11.22).

We will address the synthetic nature and the structural limitations of linear perspective later in the text, but for now, you need only acknowledge the ambiguity and proceed with applying the Universal Ellipse Rule to establish the axial tilt of each and every foreshortened circle you draw.

The next important element to consider when drawing foreshortened circles is understanding that the center of a geometric ellipse that represents a foreshortened circle is not in the same place as the center of the foreshortened circle (Fig. 11.23). The center of an ellipse occurs at the intersection of its major and minor axes. The center of a foreshortened circle, on the other hand, is always located on the minor axis closer to the back edge of the foreshortened circle. Unlike an ellipse, horizontally bisecting a foreshortened circle will always result in the front half appearing slightly larger than the back half. This is consistent with our previous observation that things appear to get smaller as they recede into space and since apparent size diminishes with distance, it follows that the back half would not appear as large as the front half. Since there isn’t a technique for locating the precise center of the foreshortened circle, it’s best to approach it intuitively. First find the center of the actual ellipse, and then gradually move the point back until you find a place that...
11.29 To create a horizontal ring of equally sized circular shapes on the surface of a cylinder, you must start by establishing three equally spaced cylindrical cross sections (ellipses) through the core cylinder. The middle cross section is used to align the centers of the circles in the row. The upper and lower cross sections determine the height of each circle relative to its position on the curved surface of the cylinder. The secondary central axis for each new circle penetrates the new circle at a point slightly behind the major axis of the ellipse that represents it because, as we saw in Fig 11.24, the center of the foreshortened circle is always slightly behind the center of the ellipse.

sections. The first determines where you want the row of circles to be centered. The second and third, one above and one below the initial cross section, will determine the relative height of each attached circle. After indicating on the first cross section where you intend to place each circle, draw lines out from the center of that cross section, through the points you have chosen. This establishes the secondary axes with which to calculate the tilt of each of the foreshortened circles that you are attaching. Cylindrical cross sections two and three create a simple mechanism for standardizing the apparent size of each of the circles in the row (Fig. 11.29). As you saw in an earlier illustration, although the three elliptical bands are conceptually understood to be parallel in the physical world, the actual distance in the drawing between the bands varies at any given point because each of the cross sections is compressed differently depending on its position relative to the viewer's eye level.

To apply a vertical column of identically sized circles to the outside of a cylinder begin by drawing a vertical line through the center of the first circle and down the side the cylinder (Fig.11.30). On this line mark off the locations where you want the additional circles to be positioned, and then draw three equally spaced foreshortened cylindrical cross section at each of these locations to establish the relative height of each circle. To ensure that all the circles in the column will be the same width, extend vertical lines down from the left and right sides of the first ellipse that you draw.

Attaching circles to a sphere is much simpler than attaching them to a cylinder. The overall shape of a sphere is not subject to fore-
CHAPTER 11: FOreshortened CIRCLES

This concludes (whew!) this chapter's rather technical description of the changes in the appearance of circular forms in space. Fortunately, applying the rules in a drawing is far more satisfying and considerably less difficult than reading about them. Because there is certainly no shortage of foreshortened circles in your visual surroundings, you will have plenty of opportunities to apply what you have learned in this chapter.

To strengthen your ability to render observed forms containing foreshortened circles it is recommended that you postpone applying the principles of ellipses to drawings of foreshortened circles in your visual field and instead apply what you have learned in this chapter to the construction of imaginary birdhouses. Whether or not you choose to take on this assignment, you can refer to the numerous student projects reproduced here to review the issues that are fundamental to creating a reliable illusion of space with circular, cylindrical, and spherical forms.

When drawing a birdhouse begin with basic geometric forms such as cylinders, spheres, cones, and tori (doughnut shapes). Start by imagining that all the geometric forms are below eye-level (Fig 11.38, 11.39).

torus n. A ring-shaped surface generated by rotating a circle around an axis that does not intersect the circle.
CHAPTER 12: BIOMORPHIC FORM

12.3a-b Invented schema need to be simple, clear, familiar, and predictable geometric forms to function effectively as guides for cross-contour. They also need to be flexible enough to approximate the unique character of complicated volumes and surfaces. You must constantly strive for a delicate balance between predictable structure and an irregular fluctuating surface.

12.4a-b When you are combining one or more of the basic geometric solids to create an armature for an imaginary biomorphic form, draw through the simplified armature as though each element was transparent and vary the line quality to make it look like it’s moving away from the picture plane. This helps you experience the volume of the form and understand its surface.

3-D DANGER ZONES

- Don’t place important dimensional information at or near eye level.
- Avoid having dimensional forms come directly toward the viewer (angle them to the side - an angle of approximately 45° works very well).
- Avoid placing important spatial transitions on the apparent edges (profile) of the form.

"We should recognize that whatever else it does, the brain must be able to simplify and categorize the structures in the patterns it processes if it is to deal with the images delivered by its visual receptors. This means that the machinery of its visual system must place constraints on how we see."

Howard S. Hoffman
Vision and the Art of Drawing

Imagining a simplified core within an irregular form encourages increased understanding of the object in two ways: first, as an intellectual schema that leads to subtle and detailed visual comparisons; second, as a mechanical armature around which to build the form and wrap the irregular surface. A schema also helps keep surface irregularities from dominating the form because it emphasizes clarity and readability in place of the visual chaos that can easily occur when superficial details take precedence over the structural integrity of the form.
To maintain a sense of structural integrity be sure to add structural abnormalities and surface irregularities only after you have established clearly defined geometric forms at a specific eye-level. Evolve toward complexity.

To render a complicated form it is essential to identify the underlying schema. Often this includes combining rectilinear as well as curvilinear forms. Concentrate on the cross-contour transitions where the forms come together.

Cross-contours are most effective when they appear to be cutting through the forms 90° to the vertical and horizontal axes of the basic geometric schema.

Establish your eye level as soon as you begin to draw. Your choice of eye level affects every aspect of your drawing. A consistent eye level allows your simplified schema to appear as unified and integrated form in space. Be sure to apply a generous and delicate grid of cross-contours over and around each of the basic geometric forms. Where you position your eye-level has a direct impact on movement of each and every cross-contour. The greater your familiarity with the three-dimensional surface of the simplified schema, the easier it will be for you to determine how any surface irregularities can best be depicted (Figs. 12.12a-b - 12.14).

The imaginary form can go in any number of directions. Especially in your initial attempts it is recommended that you let it grow spontaneously. Enjoy your freedom. Try every combination you can think of, and don’t be afraid to fail. That’s what erasers are for. Your job is to accumulate information about the ways that imaginary geometric forms can be put together into a clear and readable three-dimensional illusion.

As the core evolves, you are encouraged to gradually add irregularity to the surface. Apply new cross-contours to each new irregularity that not only conform to the structural essence of the larg-
When you are applying tones of gray to imitate the subtle gradations of light and dark in your visual field, it is helpful to know that the iris of the human eye instantly and automatically adjusts its aperture as it scans by opening or closing in reaction to the intensity of light it perceives. This involuntary aperture adjustment moderates the amount of light that reaches the sensors at the back of the eye (retina). The lens closes down when it is looking toward light areas (reducing the amount of light that enters the eye) and opens wider when it is looking at darker areas (increasing the amount of light) (Fig. 13.2a–c). This involuntary aperture adjustment is helpful in that it makes us better able to distinguish tonal information (detail and texture) in both the brightest and the darkest areas in a broad range of lighting conditions. This ordinarily beneficial perceptual mechanism, however, causes us to experience a compressed tonal range throughout our visual field (light areas appear slightly darker, and dark areas appear slightly lighter). This compression of the tonal range impairs our ability to accurately differentiate relative values in different parts of our visual field. To effectively use chiaroscuro in a drawing, it is essential that you find a way to overcome the value compression and accurately identify the relative brightness of each tonal element in the visual field. To do this you need to standardize the aperture through which light enters the eye. You can’t control your iris, but you can use your eyelids to standardize the amount of light you let in. By squinting tightly, to the point where you see your eye lashes twitching you can see only highlights and deep shadows. Squinting allows you to estimate accurately the relative difference between any two value gradients. Squinting quickly identifies the very lightest of highlight areas as well as the range and depth of the shadows.

If you approach chiaroscuro without squinting, your tonal estimates will be seriously distorted by the involuntary expansion and contraction of your iris. Squinting compensates for those involuntary fluctuations. The difference in perceived tonal relationships when you are and when you are not squinting is substantial. If you’ve never tried squinting, you will be pleasantly surprised by how effectively it clarifies comparative value relationships. Not uncommonly, surfaces that initially appear to be highlights when your eyes are wide open are revealed to be middle tones or even shadow tones once the amount of light entering the eye is standardized. Recognizing that certain areas are actually closer...
CHAPTER 13: CHIAROSCURO

Angular relationship to sources of reflected light. **Reflected light** is a secondary light source caused by light bouncing off of the surface of other objects. Capturing the subtle variations that occur when light reflects off neighboring objects is perhaps the most important element of a chiaroscuro drawing (Fig. 13.9a-b). Reflected light takes what would otherwise be individually illuminated objects and integrates them, by means of a delicate dance of bouncing photons, into a consistent and coherent illusion of spatial relationships. As mentioned earlier, when you are evaluating value relationships, you must compensate for the effects of simultaneous contrast that involuntarily causes a substantial overestimation of the brightness of reflected light within a shadowed area (Figs. 13.10, 13.11). The best way to accomplish this is to (say it with me) squint!

To distinguish subtle tonal variations you must work with your eyes open but you must also repeat the squinting process regularly throughout the drawing process to make sure that each value adjustment you are making with your eyes open also fits within the overall tonal pattern you see when you squint. This means that the tonal relationships in your drawing must

13.9 Rarely do shadows appear as a solid black. They usually reflect some light, and they usually have a subtle gradation that changes throughout the shadow area. It is usually slightly darker near the edges of the shadow where it comes in contact with lighter areas (simultaneous contrast) and lighter toward the center (core) of the shadow. The purest black that your charcoal can deliver should be reserved for accenting only those areas within a shadow that are the absolute darkest points in the composition.

13.10 In this image a bottle is casting a shadow across a checkered tabletop of dark gray and light gray squares. The square marked with an A is a dark square in the illuminated portion of the checkerboard, and the light gray square marked B is located in the shadow area. The perceived difference in value between squares A and B appears to be at least four steps (see bottom chart). Now try squinting and then turn the page.
13.23 Caravaggio, The Calling of St. Matthew, (San Luigi dei Francesi, Rome). The theatrical side lighting, stage-like shallow setting, deep shadows, and sharply contrasting highlights that were popularized by Caravaggio’s emotional and dramatic paintings during the 17th century became the hallmarks of Baroque painting. The dramatic effectiveness of Caravaggio’s paintings and of those of the many artists who have been and are influenced by him (known as Caravaggisti) suggests there is something in the very nature of light and dark that when pushed to extremes can create a spiritual or emotional tension reminiscent of the ancient mythic interpretations in which light and dark are presented as primal cosmic forces.

"More Light!"  
Goethe  
(on his deathbed)

CHAPTER 14  HISTORICAL PERSPECTIVE

Although arguments can be made as to the benefits of introducing linear perspective at an earlier learning stage of observational drawing, there are several good reasons for postponing its introduction until after you have accumulated extensive observational drawing experience. Familiarity with intuitive gesture, perceptual grid, foreshortening, and especially clock angles, provides a solid experiential framework for understanding the technical aspects of linear perspective. It can also be argued that having hands-on observational drawing experience prior to learning linear perspective acts as a safeguard against being intimidated by the surprisingly synthetic nature of the spatial coding system that was developed during the Renaissance.

However, before we begin our in-depth study of the mechanical inner workings of linear perspective, let’s first take a broad overview of the psychological, theological, philosophical, historical, and mythological premises underlying the scientific linear perspective system discovered by Filippo Brunelleschi.
CHAPTER 14: HISTORICAL PERSPECTIVE

To begin our study of perspective let's compare some of the essential structural features of scientific linear perspective (Visual Field) with how 20th century perceptual psychologist J. J. Gibson observed we actually process visual information (Visual World). When comparing his observations with the principles of linear perspective, it becomes immediately apparent that the defining characteristics of these two systems rarely coincide. An item-by-item comparison reveals that the Renaissance linear perspective system is remarkably limited in its ability to address the majority of what actually constitutes direct visual experience despite the fact that images that utilize this system are generally referred to as 'realistic.' This observation is not intended to diminish the long and revered tradition of scientific linear perspective but only to, in the spirit of full disclosure, acknowledge its undeniable limitations. Although later in this chapter we will address linear perspective's unique strengths, for now it is important to acknowledge that this comparison reveals linear perspective to be an artificial (synthetic) system that is incapable of translating substantial amounts of what constitutes our visual experience. Linear perspective is a limited, synthetic, mechanical spatial system that offers a rational presentation of space by providing an effective graphic substitute for the complex way that the eye and the mind process visual information. Acknowledging the limitations of linear perspective is important at the outset because much of the frustration and difficulty people encounter when applying this system is the direct result of losing sight of its limited and artificial nature. Recognizing the limitations and artificial nature not only provides insight into what linear perspective cannot do but also helps sensitize us to the expressive implications of what is nonetheless a remarkable system for capturing and communicating valuable types of three-dimensional information.

The limitations of linear perspective are not restricted to conflicts in how we process visual information. There are also multiple philosophical issues to consider. The very nature of pictorial illusion has generated intense opposition from some of the major contributors to Western culture, not the least of which is one of its most influential philosophers, Plato. While it is certainly true that Plato predated the discovery of a fully functioning system of perspective by nearly two thousand years, he opposed the mimetic art of his own era in carefully reasoned arguments that serve as the basis for a long-running philosophical
While many of the rational thinkers who supported mimetic imagery were influenced by Neoplatonism, others followed the philosophical position known as nominalism. Unlike idealists, nominalists do not believe ideal forms have an independent reality. For them, ideal forms are simply a method of ordering and classifying the individual things that actually do exist. Each thing exists uniquely and in direct relation to the Divine. Artists influenced by nominalism specialized in rendering material objects accurately and in minute detail (Fig. 14.6 a-b). Nicholas of Cusa (A.D. 1401-1464) observed that because light was the first thing God created, it should be understood to be the energizing force of the universe. He concluded that sight was the divine essence, and that to understand optics was to understand the very nature of God. Sight is sanctified. As understood by Nicholas of Cusa, divine omnivisage is the basis for the relationship between each particular thing and God (Fig. 14.7). A thing exists because God sees it. It should come as no surprise that this theory encouraged intense scrutiny of the visible world and promoted images that contained remarkable detail in as much as detail was understood to express the interrelatedness of matter and intangible cosmic order. As

"For me the subject of the picture is always more important than the picture. And more complicated. I do have a feeling for the print but I don't have a holy feeling for it. I really think that is what it is about. I mean it has to be of something. And what it is of is always more remarkable than what it is."  
Diane Arbus

By AD 1425 Filippo Brunelleschi, a sculptor, architect, and engineer, had rediscovered linear perspective while rendering antique architecture. It is said that he rediscovered linear perspective because there is substantial evidence to suggest that geometric perspective was known to Ptolemy of Alexandria, a scientist and philosopher, as far back as the 2nd century AD. It seems, however, that this knowledge of perspective was applied only to mapmaking and stage designs prior to the 15th century. Brunelleschi, after his rediscovery, worked only as an architect and engineer.
CHAPTER 15: LINEAR PERSPECTIVE 1- & 2-point

15.9 By projecting your imaginary picture plane out along the line of sight toward your fixation point, you can determine its alignment to the edges of each rectilinear object in your visual field. The nature of the perspective relationship between each object and the viewer depends on the number of sets of its leading edges that are parallel with the picture plane. In the example above, the picture plane is parallel with both sets of leading edges (verticals and horizontals) of each of the rectilinear solids. When this condition is met, the rectilinear solids are in a one-point perspective relationship with the viewer. As you might have noticed, because this image is being viewed from a vantage point that is 90° from that of the viewer depicted on the right, each of the rectilinear solids also appears in one-point perspective as you view this picture.

When the picture plane is parallel with two sets of leading edges of a rectilinear object (or flush with the front surface), you are in a one-point perspective relationship with that object (Fig. 15.11a). When only one set of leading edges (usually vertical) is parallel to the picture plane, you are in a two-point perspective relationship with the object (Fig. 15.11b). When there are no sets of edges that are parallel to the picture plane, you are in a three-point perspective relationship with the object (Fig. 15.11c). You will be introduced to one- and two-point relationships in this chapter. The three-point is somewhat more complicated and will be covered on its own in Chapter 16. It is worth repeating that all perspective relationships are based on a fixation point and a picture plane perpendicular to the line of sight. When these conditions are met, the number of leading edges on the rectilinear solids that are parallel to the picture plane determines the perspective relationship between the object and the viewer.

When one or more rectilinear object is in a one-point perspective relationship with the viewer, the object's edges that are parallel to the ground plane will always appear as horizontal lines and the edges that are perpendicular to the ground plane will
CHAPTER 15: LINEAR PERSPECTIVE 1- & 2-point

level and imagine a picture plane that is perpendicular to the line of sight. Again, the perspective relationship will be determined by imaginatively projecting this picture plane out into the visual field and seeing how it aligns with the edges of the rectangular forms (Figs. 15.14, 15.15a-b). If the picture plane is parallel with one, and only one, set of the object's leading edges (usually the verticals), the viewer is in a two-point perspective relationship with that object.

The most annoying characteristic of Brunelleschi's synthetic perspective system is that when you are staring at the fixation point, it is very difficult to see the objects you are intending to draw. When you shift your line of sight to look at the objects, you can't help but rotate your picture plane. This rotation alters all the perspective relationships of the objects to your picture plane. What we have here is a catch 22 because this entire system is predicated on staring directly at the fixation point, but it sure is difficult to draw what you can't see. The only solution is to bite the bullet (gently) and CHEAT! Well, at least bend the rules. You have to look at the objects if you are going to draw them. It is possible, however, to keep the fixation point in mind while you draw, especially when you are establishing the

WHERE TO PUT THE FIXATION POINT

There is considerable flexibility in where you choose to put the fixation point on the drawing surface. It doesn't have a prescribed location. It can go anywhere, even outside the edges of the paper, as long as, once you decide where you want it, you maintain accurate spatial and proportional relationships between the fixation point and the objects you are drawing. Once you have established your fixation point, the size and placement of the objects relative to the fixation point in the drawing must correspond to the position and proportion of the objects relative to the fixation point in your visual field. While the fixation point has no actual physical presence, it is, nonetheless, very real. It serves as the mechanical glue that holds the perspectival and proportional relationships together. The fixation point must be taken into account each and every time you draw from observation if your goal is to capture the subtle nuances of the spatial relationships in your visual field.

15.14 All Brunelleschian perspective drawings must have a fixation point at eye level and an imaginary picture plane perpendicular to the line of sight. In this image the imaginary picture plane is parallel with only one set of leading edges of the rectilinear objects (only the verticals), so all of the rectangular solids above are in a two-point perspective relationship with the viewer on the right.

15.15a-b When your imaginary picture plane aligns with only one set of edges of a particular rectangular form (usually it will be the verticals) as it moves forward along your line of sight toward your chosen fixation point, then you are in a two-point perspective relationship with that object. All vertical edges that are parallel with the picture plane appear straight up and down while the edges that are moving away from the picture plane appear to tilt (on the table).
15.18a A fixation point is essential even when none of the rectilinear objects in the drawing are in a one-point perspective relationship with the viewer. Brunelleschi's system requires that you draw from a single position and that you look toward a single fixation point throughout the entire drawing. This means you need to establish a fixation point at the very beginning of the drawing and maintain it throughout the entire process. Otherwise there is a tendency to change the direction of your line of sight and shifting your line of sight (fixation point) even slightly causes marked changes in the angle at which your picture plane aligns with the edges of the objects in your visual field. Changing your line of sight changes the apparent angles of the orthogonals as they converge toward their respective vanishing points. Once you have chosen a fixation point and have calculated the perspectival relationship of the objects in your visual field you should begin your drawing by gesturing, applying Mondrian lines, checking proportions, and using your straight-edge as a clock-angle tool to establish the angles at which the receding edges converge. It is also a good idea to pay special attention to your line quality so as to prevent the mechanical character of the system from dominating the expressive character of the drawing.

15.18b In a two-point perspective relationship your imaginary picture plane is parallel to only one set of leading edges (usually the verticals). Any edges that are parallel to the ground plane are, by definition, receding and will appear tilted. Sets of parallel receding edges will converge at some point on the horizon other than the fixation point. As can be seen above, one set of these receding parallel edges has a vanishing point to the right of the fixation point and the other to the left. This is always the case with a two-point perspective relationship. Vanishing points rarely appear within the drawing surface unless you draw very small or have an incredibly large pieces of paper. As a result, Brunelleschi's system of a horizon line with two vanishing points actually turns out to be more helpful as a conceptual aid than as a mechanical tool for determining the angle of convergence. You will generally be much better off relying on clock-angles to calculate the angular tilt of receding edges than actually looking for vanishing points. Because all the rectilinear objects in this illustration are aligned squarely with one another, there are only two sets of receding parallel edges (orthogonals). Each receding edge converges with all the other edges with which it is parallel.
16.3a-d In Brunelleschi's system you start with a fixation point at eye level and project the picture plane toward it to see how it aligns with the edges of the rectangular solids in your visual field (image A). If it aligns with two sets of leading edges, the rectilinear object is in a one-point perspective relationship (image B, boxes a, b) and the orthogonals converge on the fixation point. If it aligns with one set (usually the verticals), the object is in a two-point perspective relationship (image C, box c) and the two sets of orthogonals converge on the horizon at points on opposite sides of the fixation point. However, if it aligns with no set of leading edges, the rectilinear object is in a three-point perspective relationship. When the picture plane first makes contact with a corner, each edge that is connected to this corner is receding back into space, as are the edges with which it is parallel. With three-point perspective, each set of receding parallel edges converges toward a vanishing point that can be almost anywhere (image D, boxes d, e). These vanishing points are difficult to pinpoint, so you are best served using a clock-angle tool to determine the tilt of each of the receding edges.

16.4a-c An object that is depicted in a three-point perspective relationship is generally more emotionally charged than an object in one-point or two-point. As a species we are more comfortable with verticals and horizontals because we rely on them for maintaining balance and equilibrium. Three-point orientation is intrinsically unstable in its appearance, and as you will find out from your attempts to set objects up to draw, they are intrinsically unstable in the physical world as well.

of tilt of the receding edges of objects in a three-point perspective relationship, it is surprisingly common to mistakenly reverse the direction of the convergence of those edges. To prevent this from happening, you need to walk around the object so that you can view it from the side (90° to your original line of sight). From this new position you can analyze the tilt of the object more precisely and identify the corner of the object that is closest to the original drawing position. After you have identified the closest corner, you can return to where you started secure in knowing in what direction each of the three edges recedes. After loosely gesturing the object, use the clock-angle tool to calculate the tilt of each of the three receding edges. At this early stage of the drawing it is highly recommended that you put arrows at the ends of each of the three diverging edges that recede from the leading corner of the object. The arrows indicate the direction of their recession from the initial point of contact with your picture plane and serve as helpful reminders of the direction of convergence (Figs. 16.4a-c, 16.5).

Precariously positioned rectangular solids come in so many different orientations that they often challenge Brunelleschi’s clear-cut distinctions between one-, two-,
CHAPTER 16: 3-point PERSPECTIVE

16.9a-b When you look up or down rather than straight at the horizon, your picture plane tilts as your line of sight shifts, and therefore the picture plane is rarely flush with any of the edges of rectilinear objects that are sitting flat on the ground plane. In this three-point perspective relationship, all of the vertical edges of rectilinear forms sitting on the ground plane are receding. Since the vertical edges are, by definition, parallel with one another they will all converge at a single point below the observed object.

... makes first contact with the corners of objects (Fig. 16.9a-b).

Some drawing texts suggest that an image of a tall building in which the horizontal edges appear to be in a two-point perspective relationship but whose vertical edges converge at a point in the sky, represents an accurate example of a three-point perspective relationship (Fig. 16.10). This is somewhat misleading. These images start out using Brunelleschi’s system and then, without warning, shift to the tilted imaginary picture plane approach. Unfortunately, when you combine two separate lines of sight in a single image, it creates a lack of consistency and integrity.

16.10 A fairly common error in non-Brunelleschian perspective occurs when multiple viewing angles are combined into a single drawing. In the image above, the horizontal edges of the building are presented as though they are in two-point relationship with a fixation point on the horizon, while the vertical sides appear as though the observer is looking up toward the top of the building.

16.11a-b Including perspective information about rectilinear forms that are both inside and outside the 45° cone of vision compromises the logical integrity of both Brunelleschian’s system and the non-Brunelleschian system because it violates the essential principle that the viewer must maintain one and only one fixation point throughout the entire drawing process. In Charles Scheeler’s DeLmonica Building, (lithograph, 1926, above right), he has established a non-Brunelleschian three-point perspective relationship with all of the buildings in his visual field by looking up toward the sky rather than straight ahead at a fixation point on the horizon.

"Genius begins where rules end."

William Blake

... when compared to drawings with a fixed gaze. The only way you could be looking up at an object that was high above your original line of sight would be to shift your line of sight above the horizon (Fig. 16.11a-b). Mixing two lines of sight in the same drawing tends to make the picture plane feel as though it is curving away from the viewer. We saw this kind of distortion earlier with exaggerated birdhouses whose ellipses...
16.16 William Hogarth, *Perspective Absurdities*, 1754. Hogarth, an 18th-century painter and printmaker known for his social commentary, playfully compiled an image that illustrates many of the inherent ambiguities in the various techniques that are traditionally used for creating the illusion of three-dimensional space on a two-dimensional surface. Your ability to recognize and explain the anomalies created by William Hogarth will constitute your final exam. You may begin now.

16.17 Claude Monet, *The Morning*, 1919–1926, from the Water Lily series (Musée de l’Orangerie, Paris). Monet’s preoccupation with light and color led him to apply his paint in small, comma-like brush strokes. His revolutionary approach forced the viewer to acknowledge the paint, brush strokes, and color on the flat surface.

16.18 Paul Cézanne, *Mont Sainte-Victoire* seen from the Bibemus Quarry, oil on canvas, 1897. Cézanne moved toward an intuitively structured reorganization of form that emphasized the flatness of the painting surface.

16.19 Elements that dominated this period (a wide variety of isms under the umbrella of Modern Art) generally share a heightened reverence for the flatness of the artwork’s surface. The motivation behind this change in attitude concerning pictorial space was to some extent a re-emergence of the philosophical and psychological controversies that were discussed earlier but it was also an intuitive reaction to the visual power and physical immediacy of a flat surface as opposed to a surface that is understood as a transparent window through which the depicted objects can be seen. In many respects, the two-dimensional art of the last hundred and fifty years can be understood as a lively and productive debate centered...
CHAPTER 17: COMPOSITION

of reasoning) to combinations and permutations of form, shape, color, value, and line, as well as representational and psychological content. However, while acknowledging the pivotal role of intuition in organizing a picture, it will be necessary to start our discussion of composition with a rational understanding of Gestalt perceptual principles, the dynamic forces that energize the pictorial field, and the many organizing formulas (underlying compositional schemata) that have been applied for centuries as guides for making works of art pleasing and attractive.

The compositional principles, forces, elements, and organizing methods, in this chapter are not to be taken as formulaic recipes that can be slavishly applied to produce engaging compositions. To compose a picture you must rely on your emotional response and direct visual experience. There is no predetermined checklist of prescriptive compositional rules that can guarantee success. That being said, however, it is equally true that any artist who willfully disregards perceptual principles, pictorial dynamics, and design elements, and organizing schemata risks losing the attention of his/her viewer.

The goal of visual perception is to successfully negotiate the physical world. To assist in this process the human central nervous system has evolved to identify meaning in our perceptions by searching for object recognition and/or purposeful organization. This is known as the perceptual imperative, and you have experienced it firsthand any time you looked at billowy clouds and found instead castles, animals, or faces. Gestalt perceptual principles are the specific mechanisms by which the human brain organizes visual information into meaningful experience. Unity, harmony, coherence, and wholeness in the visual field contribute to a satisfying, pleasurable, and engaging perceptual experience. The mechanisms that help us organize perceptual information were first identified by German psychologists in the 1920s (Figs. 17–1, 17–2). Gestalt means “unified whole.” Because of these mechanisms the eye finds a well organized visual field engaging and derives pleasure in repeatedly scanning it. However, when the brain is unable to make sense of a visual experience, the eye quickly becomes impatient and frustrated and driven to look somewhere else. Organized pictorial fields attract and engage the eye; disorganized fields repel it.

17.1 The uppermost geometric forms illustrate the simplicity principle where the brain seeks the simplest solution interpreting what it sees. 1 is most easily read as a set of flat triangles, 2 reads equally as flat shapes or a dimensional cube, and 3 reads most easily as a dimensional cube. The center image demonstrates how our brain applies closure to supply meaning to incomplete visual data. The lower figure reveals a diamond shape that demonstrates the strength of similarity in establishing implied spatial relationships.

17.2 The uppermost image illustrates the strength of our satisfaction when easily recognizing figures against the ground in our visual field. The grouping of shapes in the middle image reveals our tendency to group shapes or objects that are in close proximity regardless of their individual characteristics. The image at the bottom is an effective example of the organizing power of continuation where implied rather than specified linear connections lead the eye around the design.
Fig. 17.20a-c in the left and center images the lines and edges have been precisely aligned around basic geometric shapes. In the image on the right, there is no precise alignment of line segments or edges, but our eye still finds pictorial organization.

us to make connections between lines and/or edges that are slightly askew (Fig. 17.20c).

Because of the effectiveness of continuation and closure, artists have long relied on geometric shapes as underlying compositional schemata for all styles of image making. Certainly, western art traditions from the Renaissance through the French Academy taught the importance of clear geometric organization (Figs. 17.21, 17.22a), but the modern aesthetic reaction against the structured teaching methods makes it unclear whether the organizational geometry that occurs in images of the 20th and 21st centuries was rationally or intuitively derived (Fig. 17.22b-c).

17.21 Masaccio's Trinity was the first Renaissance image to incorporate rational, geometricized sight to create the illusion of depth. The use of geometry not only had roots in mystical symbolism but was also understood to be an excellent way to organize the composition. Masaccio seamlessly wove together his rationalized spatial system, his geometric organizational system, and his spiritual symbolism - and in the process created a visually and intellectually engaging image for the ages.

CHAPTER 17: COMPOSITION

these prohibitions to heart: many a still life has been rendered life- less due to the most important element appearing in the center, and many a landscape sketch by a horizon line bisecting the picture plane.

One way to break the habit of placing the horizon line in the middle of the page is to shift your point of view (POV) away from the horizon line. As we learned in the previous chapter, looking up or down when choosing a composition causes the elements to appear in more dynamic and unexpected arrangements. The effectiveness of the Degas' composition we saw earlier illustrates how visually engaging this approach can be (Fig. 17.28).

When creating a composition from observation, experiment with a variety of pictorial arrangements before settling on a final design. The best for generating pictorial experimentation is to draw an extensive series of thumbnail sketches. Thumbnails are quick compositional drawings developed like intuitive gestures: rapid, abbreviated drawings concentrating only on the distribution of major elements with little or no concern for corrections. Thumbnails should always be small (2 to 5 inches maximum), and the first thing you draw should be multiple rectangular formats in

17.28 Edgar Degas, The Tub (1886, Pastel on paper, Musée d’Orsay, Paris, France). Degas generated considerable visual interest in his depiction of a woman at her bath by combining a non-Brunelleschian point of view that is looking down on the figure from above with a daring use of tangencies around all four edges of the pictorial field.

17.29 Before beginning a thumbnail, it is essential that you first draw a border in the proportions that you feel will be most appropriate for the objects you wish to draw. Thumbnails are small (3 to 5 inches), rapidly drawn, simplified images that focus on the distribution of forms in relation to the outside border. Shifting your drawing position, rearranging the objects, or changing your POV are all methods that can encourage compositional variation.

17.30a-c Mechanical devices can be extremely helpful in isolating and identifying engaging arrangements of forms within the border of the picture: the open viewing frames, the grided viewing frames, or the always available hand viewing frame.

the proportions that you are considering for your finished work. If you are planning a composition for a project on a specific canvas or piece of paper that you have already purchased, make sure to proportion each of your thumbnail templates to match the proportions of your chosen surface (Fig. 17.29).

A viewing frame is a very simple tool that can be helpful when doing thumbnails. Viewing frames are generally small rectilinear openings in pieces of paper or cardboard (openings from 1.5 to 12 inches). Although 35mm slide mounts are not quite as common as they once were, they do make handy, pre-cut viewing frames (Fig. 17.30a). Smaller sizes are more portable, but the larger ones are more practical to use in that you don't have to hold them so close to your eye. However, if the viewing frame gets too large, your arms won't be long enough to allow you to crop the composition as tightly as you might desire. To transfer the composition to your thumbnails faster and more accurately, try fitting your cardboard viewing frame with a grid of horizontal and vertical threads that divide the viewing frame (Fig. 17.30b). If you find the urge to sketch without a cardboard viewing frame available you can always the sliding hand frame (Fig. 17.30c). One last option
MASTER WORKS LIST

Page 272  George Tooker, Ward 1970-71, Collection of Mr. and Mrs. Joel G. Harriott.
Page 274  Gustave Caillebotte, Le Déjeuner, 1876, Private Collection.
Page 274  William Hogarth, Perspective Absurdities, 1754, from J. Kirby’s “Dr. Brook Taylor’s Method of Perspective Made Easy in Both Theory and Practice,” Ipswich.
Page 276  Paul Cézanne, Mont Sainte-Victoire seen from the Bibemus Quarry, oil on canvas, 1897.
Page 276  Georges Seurat, La Parade (The Side Show), 1887-88, Metropolitan Museum, NYC.
Page 276  Georges Braque, Mozart Kubelik, 1912.
Page 276  Marcel Duchamp, To Be Looked at (from the Other Side of the Glass with One Eye, Close to, for Almost an Hour), 1916, MOMA, NYC.
Page 277  Max Beckmann, The Night, Oil on canvas, 1918-19.
Page 277  Piet Mondrian, Composition in Line and Color, 1925, Rijksmuseum Kröller-Müller, Otterlo, the Netherlands.
Page 278  Stuart Davis, Mellow Pad, 1945-51 oil on canvas, Brooklyn Museum.
Page 278  Jackson Pollock, Untitled, 1948, Private Collection.
Page 278  Brian Curtis, Timetkeeper, oil on panel, 1984.
Page 279  Andrew Wyeth, Weather, media?????, 1965.
Page 280  Edgar Degas, Satell Rehearsal, ?????????, 1891.
Page 281  Masaccio’s Trinity.
Page 283  Peter Karianis, Blue Reprise: Book and Chair, oil on canvas, 2005.

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(hard to find but worth the effort)

General Drawing Instruction


Perspective Theory and History


Design Texts

SELECTED BIBLIOGRAPHY

Art and Culture

Art and Myth

Art and Science

INDEX