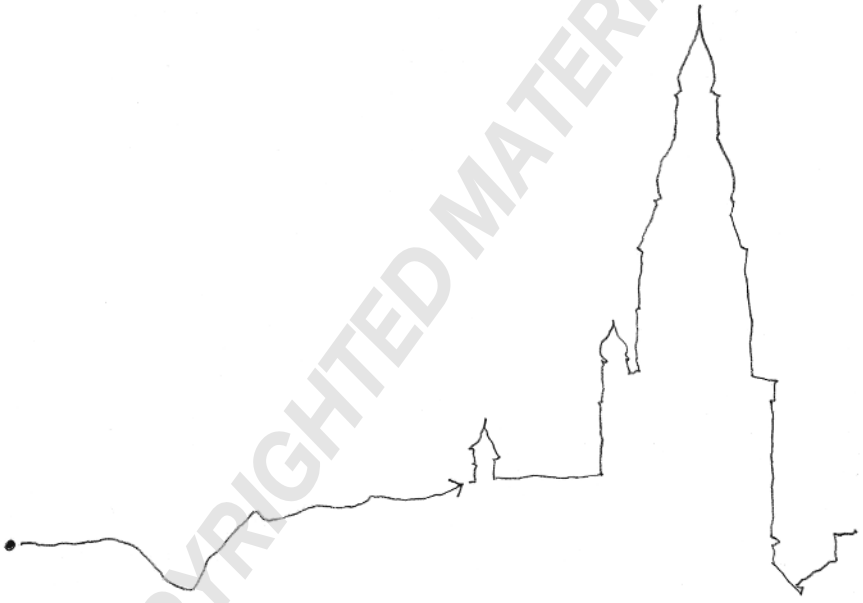
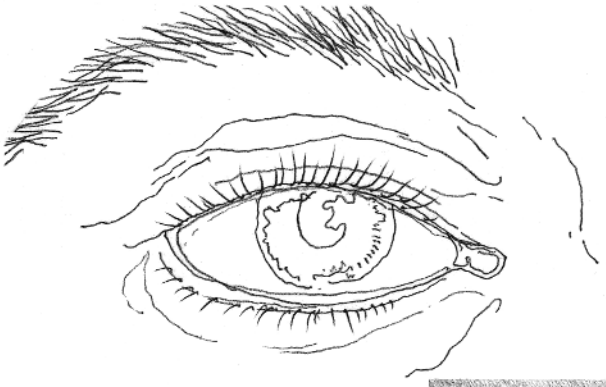
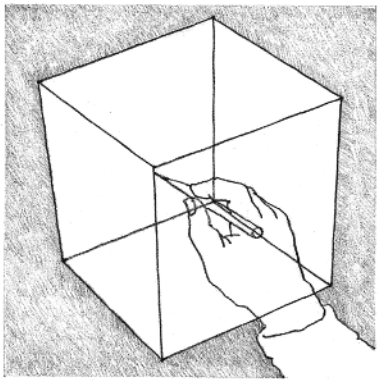
1

Line and Shape

A point has no dimension or scale. When made visible as a dot, the point establishes a position in space. As the dot moves across a surface, it traces the path of a line—the quintessential element of drawing. We rely principally on the line to portray the edges and contours of objects we see in visual space. In delineating these boundaries, the line naturally begins to define shape—the pictorial element that establishes the figures in our visual field and organizes the composition of a drawing.



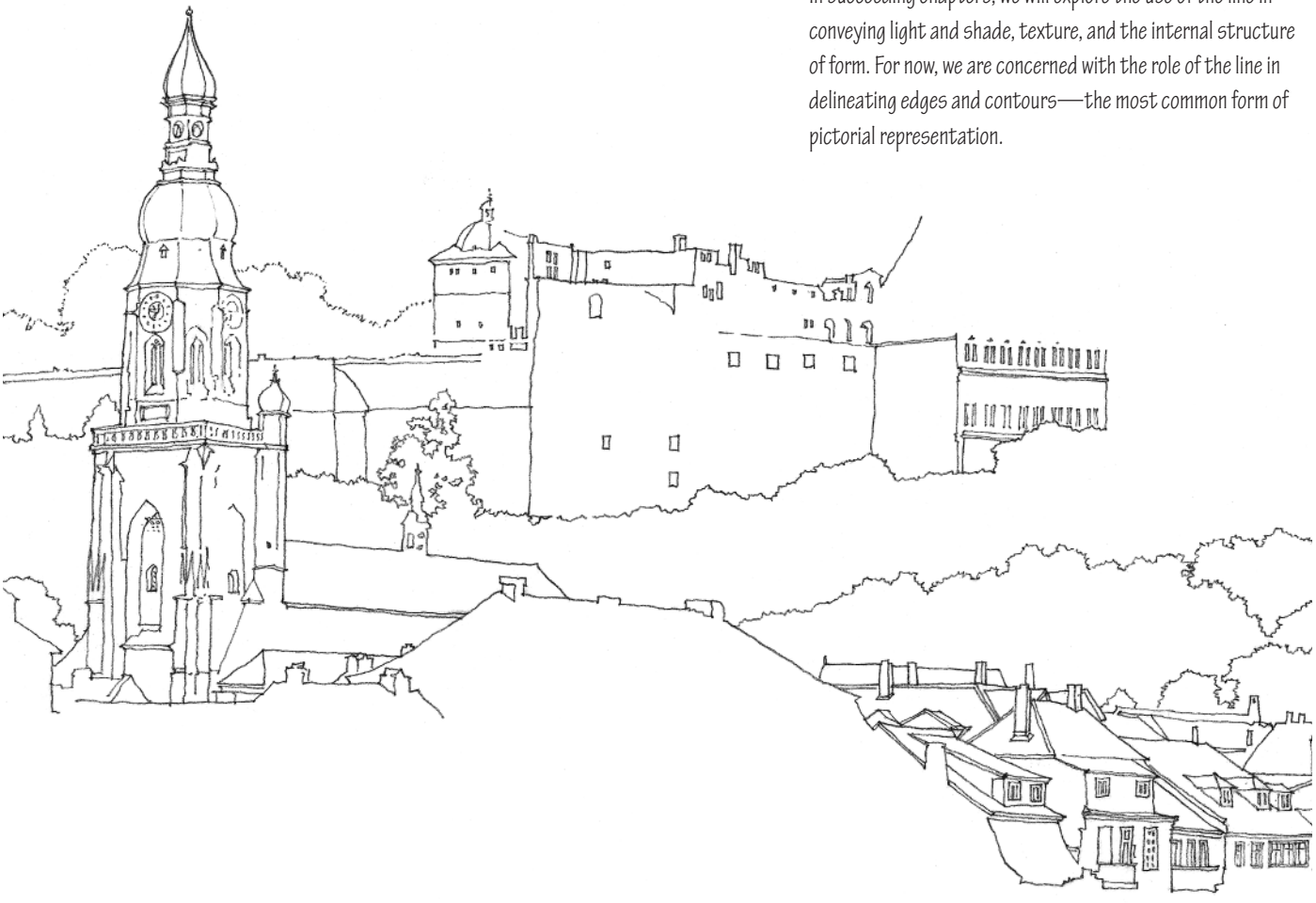




Conceptually, a line is a one-dimensional element having a continuous extent of length but no breadth or thickness. Such a line does not actually exist in the physical world of matter. Whatever we regard as a line is in fact a thin, solid volume, such as a strand of wire; or a very narrow depression, such as a crease; or a discontinuity in color or tonal value, such as where an object meets its shadow. Yet our vision perceives all of these as lines. Just as lines are critical to the way we perceive our world, they are essential in representing our perceptions in a drawing.

In drawing, we pull or drag the point of a tool across a receptive surface to produce a line. As a graphic element, the line is a one-dimensional trace on a two-dimensional surface. Yet, it is the most natural and efficient means we have to circumscribe and describe the three-dimensional form of a subject. We construct these lines as we do in sight in order to recreate a sense of the form's existence in space. And as viewers, we readily associate the drawn lines with the physical boundaries of a form and the edges of parts within it.

In succeeding chapters, we will explore the use of the line in conveying light and shade, texture, and the internal structure of form. For now, we are concerned with the role of the line in delineating edges and contours—the most common form of pictorial representation.



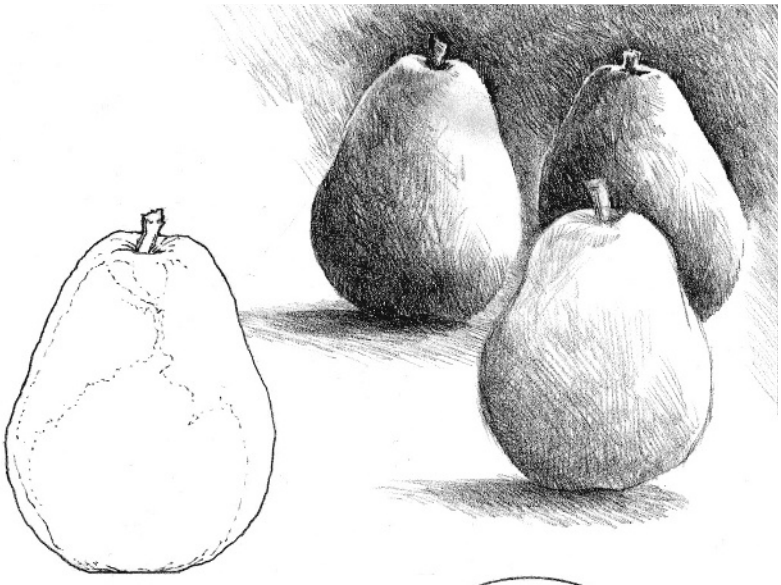
Contours dominate our perception of the visual world. The mind infers the existence of contours from the patterns of light and dark the eyes receive. Our visual system seeks out and creates a cognitive line along the points where two fields of contrasting light or color meet. Some of these edges are clear; others are lost in the background as they change color or tonal value. Still, in its need to identify objects, the mind is able to fabricate a continuous line along each edge. In the seeing process, the mind enhances these edges and sees them as contours.

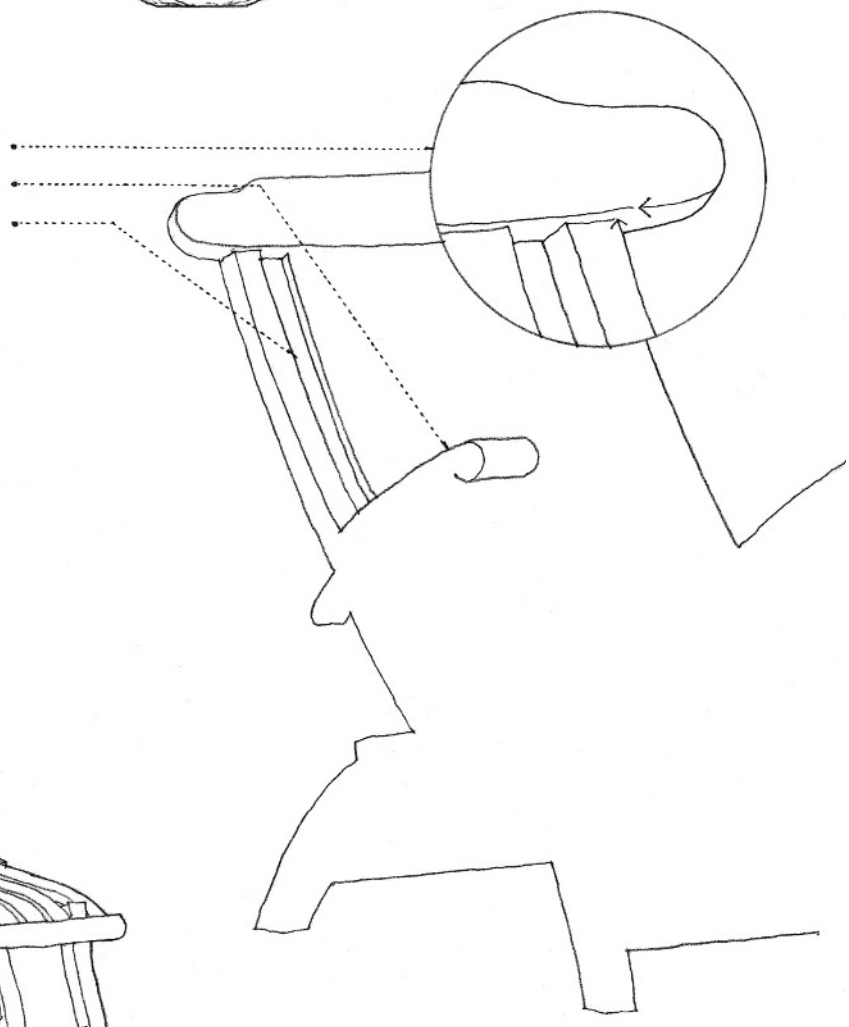
The most noticeable contours are those that separate one thing from another. These contours give rise to the images of objects we see in visual space. They circumscribe an object and define the outer boundary between the figure and its background. In limiting and defining the edges of things, contours also describe their shape.

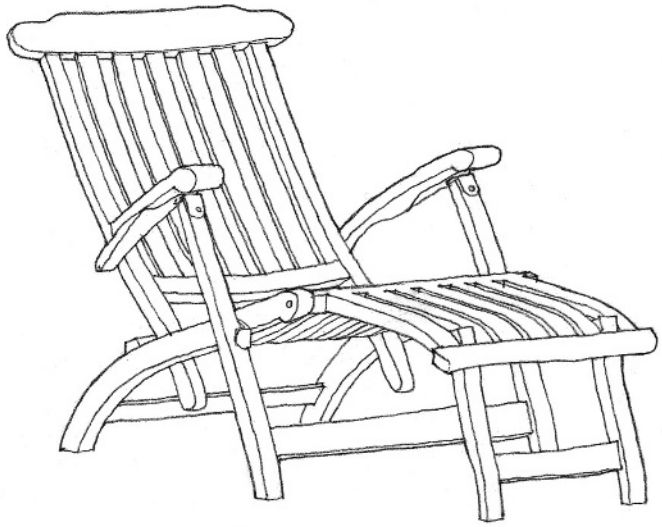
But contours do more than describe the outline of a flat, two-dimensional silhouette.

- Some contours travel inward at folds or breaks in a plane.
- Others are formed by overlapping or projecting parts.
- Still other contours describe the shapes of spaces and shadows within the form.

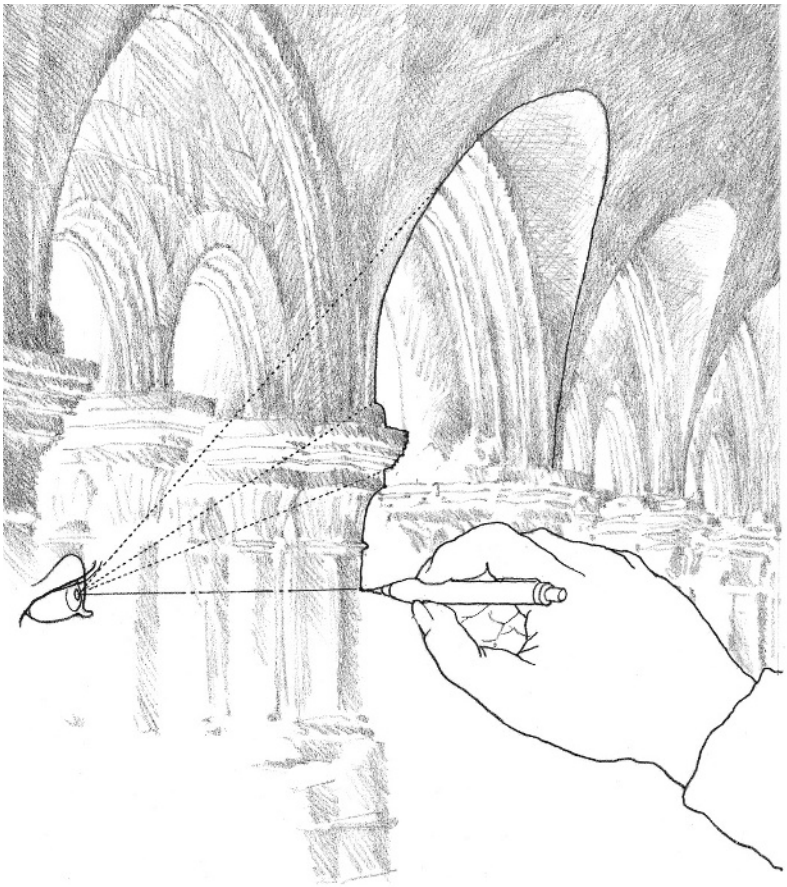
In both seeing and drawing, we are able to follow these contours as they eloquently describe the three-dimensional nature of forms in space.

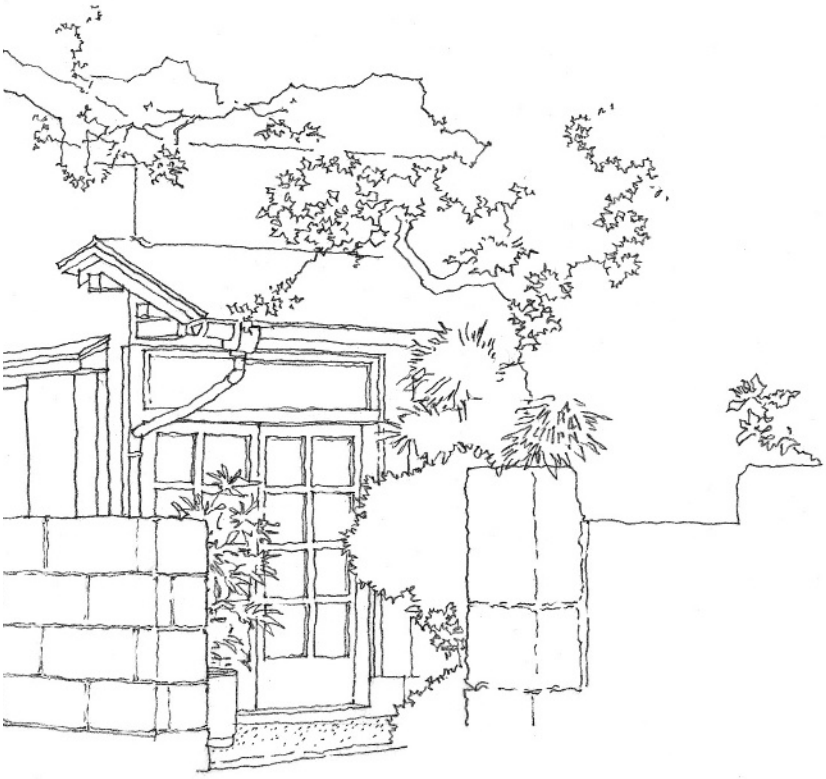






CONTOUR DRAWING



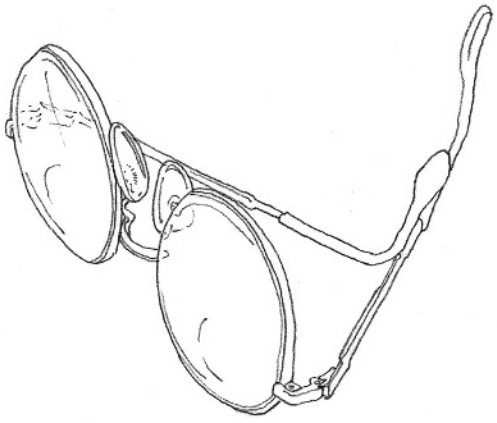


Contour drawing is one approach to drawing from observation. Its primary purpose is to develop visual acuity and sensitivity to qualities of surface and form. The process of contour drawing suppresses the symbolic abstraction we normally use to represent things. Instead, it compels us to pay close attention, look carefully, and to experience a subject with both our visual and tactile senses.

Our goal in contour drawing is to arrive at an accurate correspondence between the eye as it follows the edges of a form and the hand as it draws the lines that represent those edges. As the eye slowly traces the contours of a subject, the hand moves the drawing instrument at the same slow and deliberate pace and responds to every indentation and undulation of form. This is a meticulous and methodical process that involves working from detail to detail, part to part, and form to form.

The process is as much tactile as visual. Imagine the pencil or pen is in actual contact with the subject as you draw. Do not retrace over lines or erase them. Most importantly, draw slowly and deliberately. Avoid the temptation to move the hand faster than the eye can see; move in pace with the eye and examine the shape of each contour you see in the subject without considering or worrying about its identity.

Contour drawing is best done with either a soft, well-sharpened pencil or a fine-tipped pen that is capable of producing a single incisive line. This fosters a feeling of precision that corresponds to the acuity of vision contour drawing promotes.

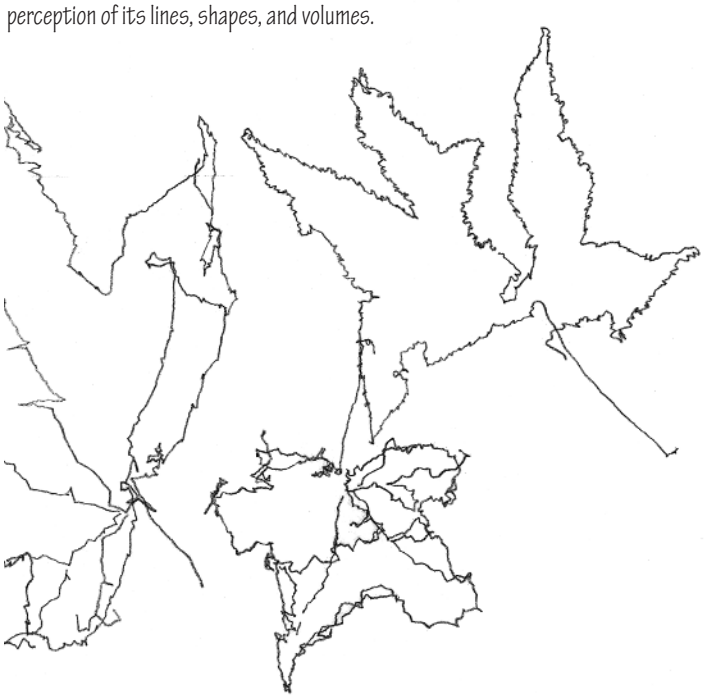


Blind contour drawing involves the drawing of contours while looking only at the subject, not the surface upon which we are drawing or the evolving image. Turn your body away from the paper and concentrate all of your attention on the subject. Your eyes should remain on the subject as the hand attempts to record on paper what you see.

Focus the eye on a clearly defined point along a contour of the subject. Place the tip of the pen or pencil on the paper and imagine it is actually touching the subject at that point. Slowly and painstakingly follow the contour with your eyes, observing every minute shift or bend in the contour. As your eyes move, also move your pen or pencil on the paper at the same deliberate pace, recording each variation in contour that you see.

Continue to draw each edge you see, bit by bit, at a slow, even pace. You may have to stop periodically as you continue to scan the subject, but avoid making these stopping points too conspicuous. Strive to record each contour at the very instant you see each point along the contour. Allow the eye, mind, and hand to respond simultaneously to each and every critically perceived event.

In this mode of drawing, distorted and exaggerated proportions often result. The final drawing is not intended to look like the object but rather to document and express your careful perception of its lines, shapes, and volumes.



MODIFIED CONTOUR DRAWING

In modified contour drawing, we begin as in blind contour drawing. But in order to check relationships of size, length, and angle, we allow ourselves to glance at the emerging drawing at certain intervals.

Begin as in blind contour drawing. Select any convenient point along a contour of the subject. Place the tip of the pen or pencil on the sheet of paper and imagine it is in contact with the same point on the subject. Check the relationship of the contour to an imaginary vertical or horizontal line. As your eyes follow the contour in space, carefully draw the contour line at the same slow and deliberate pace.

Work from contour to contour, along, across, or around the edges and surfaces of a form. Respond to each and every surface modulation with equivalent hand movements. At certain points—breaks in planes or folds across contours—a contour line may disappear around a bend or be interrupted by another contour. At these junctures, look at the drawing and realign your pen or pencil with the previously stated edge to maintain a reasonable degree of accuracy and proportion. With only a glance for realignment, continue to draw, keeping your eyes on the subject.

The more we focus on what we see, the more we will become aware of the details of a form—the thickness of a material, how it turns or bends around a corner, and the manner in which it meets other materials. When confronted with a myriad of details, we must judge the relative significance of each detail and draw only those contours that are absolutely essential to the comprehension and representation of the form. Strive for economy of linework.

Do not worry about the proportions of the whole. With experience and practice, we eventually develop the ability to scan each contour of a subject, hold an image of that line in the mind's eye, visualize it on the drawing surface, and then draw over the projected trace.

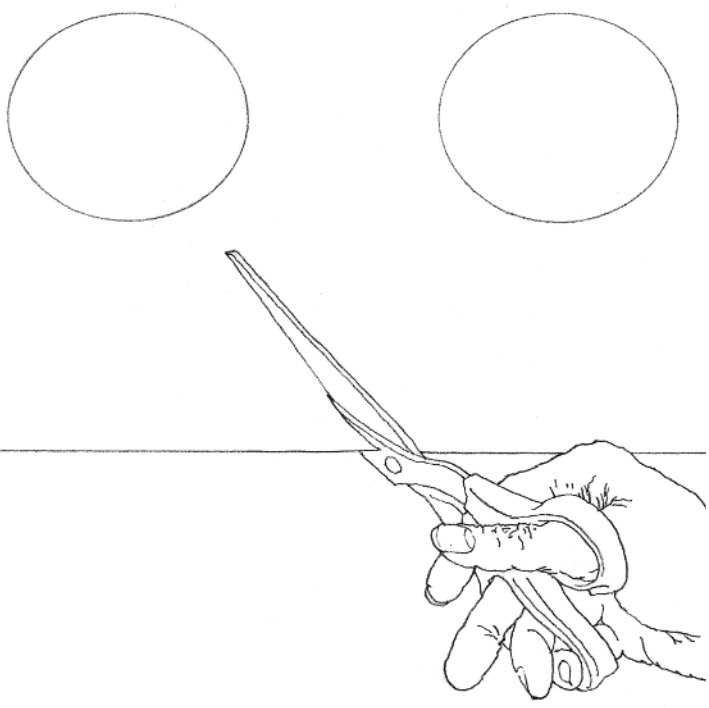
While a true contour drawing uses a single line weight, varying the width of a line while drawing enables one to be more expressive. Thickening a line can provide emphasis, create a sense of depth, or imply a shadow. The characteristics of the line used to define a contour can communicate the nature of the form—its materiality, surface texture, and visual weight.

Exercise 1.1

Pick a subject that has interesting contours, as your own hand, a pair of sneakers, or a fallen leaf. Focus all of your attention on the contours of the subject and draw a series of blind contour drawings. Blind contour drawing develops visual acuity, sensitivity to contours, and hand-eye-mind coordination.

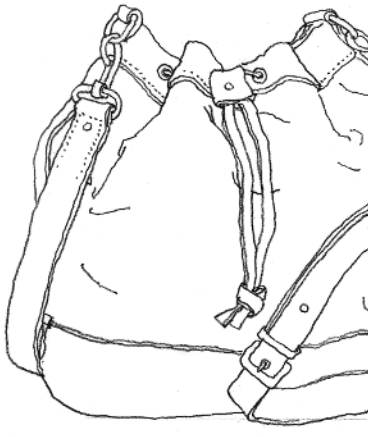
Exercise 1.2

Pair up with a friend. Draw a contour drawing of your friend's left eye using your right-hand. Then draw a contour drawing of your friend's right eye using your left-hand. Compare the drawing done with your normal drawing hand with that executed with the opposite hand. Drawing with your "unfamiliar hand" forces you to draw more slowly and be more sensitive to the contours you see. This exercise may also be done by looking in a mirror and drawing your own pair of eyes.

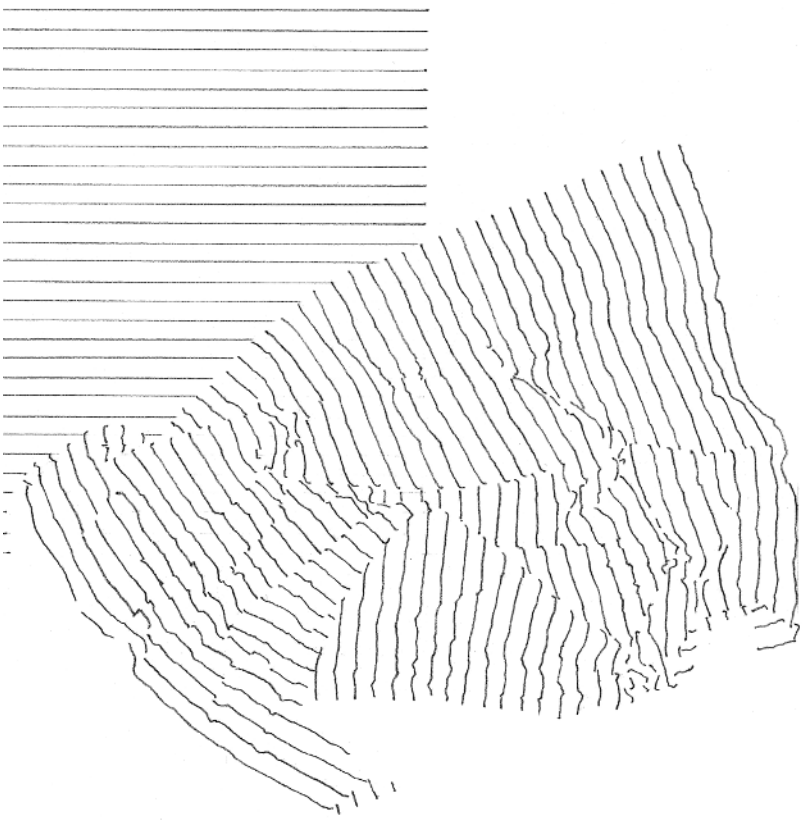


Exercise 1.3

Compose a still life of objects having different forms—flowers and a hand tool, several fruit and bottles, leaves and a handbag. Draw a series of modified contour drawings of the composition. Try not to name or identify the things you are drawing, which can lead to the drawing of symbols. Rather, pay close attention to, sense, and record the differing nature of the edges and contours as you see them.



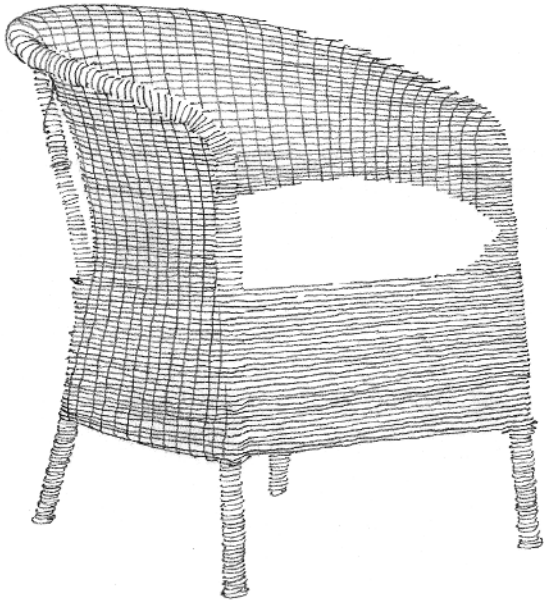
CROSS-CONTOUR DRAWING

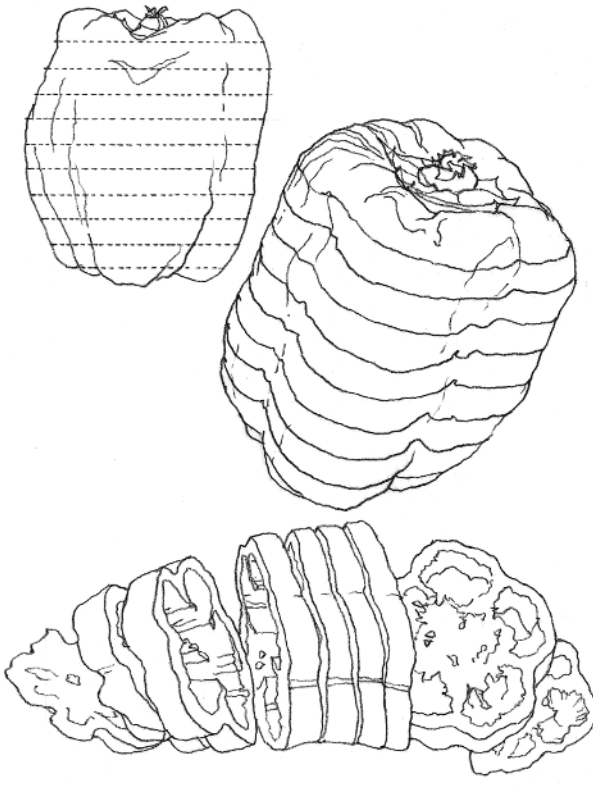


In cross-contour drawing, we draw lines not as we perceive them but as they would appear if inscribed across the surfaces of an object. So rather than depict the spatial edges of a form, cross-contours emphasize the way its surfaces turn and shift in space.

We use cross-contours to explore and represent the volumetric nature of an object, especially when its form is not composed of flat planes or is organic in character. Cross-contours flow over the ridges and along the hollows of a surface. Where the surface is indented, the cross-contour line indents; where the surface rises, then the cross-contour line rises as well.

To better visualize the spatial turns and shifts that occur along the surfaces of an object, imagine cutting a series of equally spaced, parallel planes through the form. Then draw the series of profiles that result from the cuts. Through the series of closely spaced cross-contour lines, the form of the object will emerge.

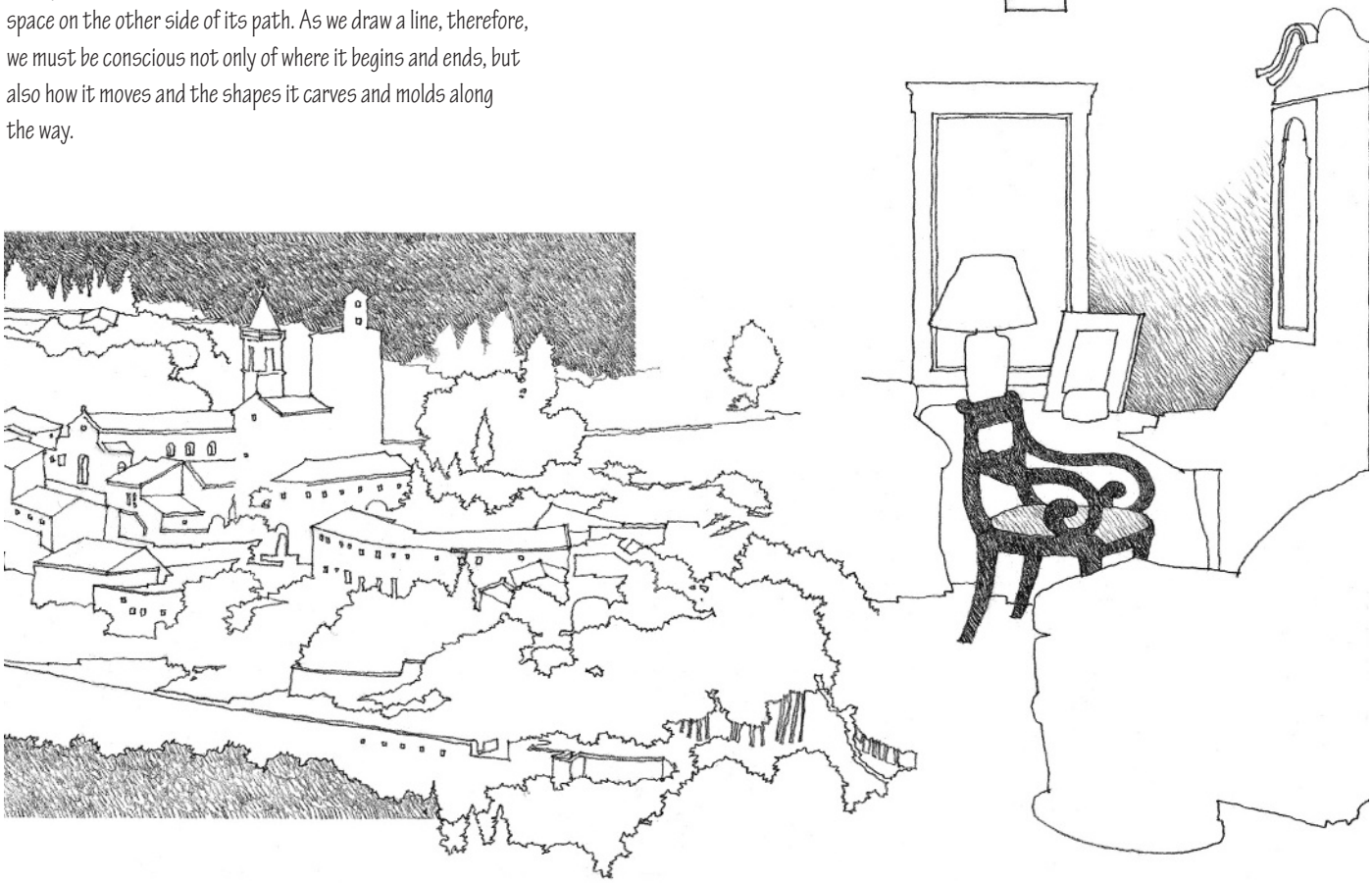




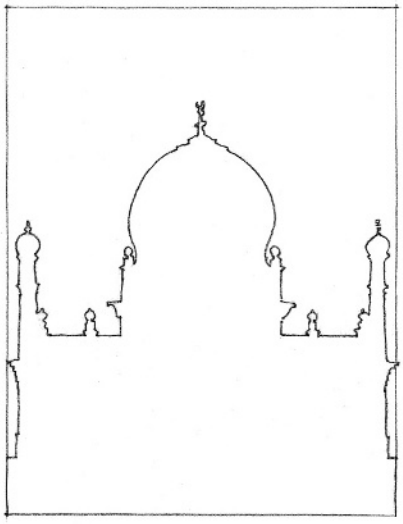
The lines we see in visual space correspond to discernible changes in color or tonal value. In contour drawing, we use visible lines to represent these lines of contrast that occur along the edges of objects and spaces. The contour lines delineate where one area or volume begins and another apparently ends. Our perception and drawing of the boundary lines that separate one thing from another leads to our recognition and description of shape.

Shape is the characteristic outline or surface configuration of a figure or form. As a visual concept in drawing and design, shape refers specifically to a two-dimensional area enclosed by its own boundaries and cut off from a larger field. Everything we see—every area in our field of vision enclosed by a contour line or bounded by an edge between contrasting colors or tonal values—has the quality of shape. And it is by shape that we organize and identify what we see.

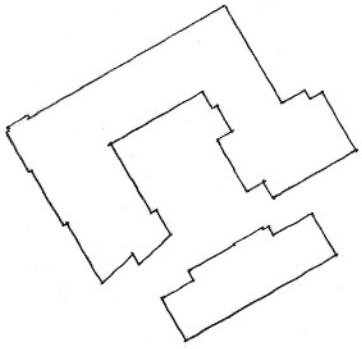
A shape can never exist alone. It can only be seen in relation to other shapes or the space surrounding it. Any line that defines a shape on one side of its contour simultaneously carves out space on the other side of its path. As we draw a line, therefore, we must be conscious not only of where it begins and ends, but also how it moves and the shapes it carves and molds along the way.



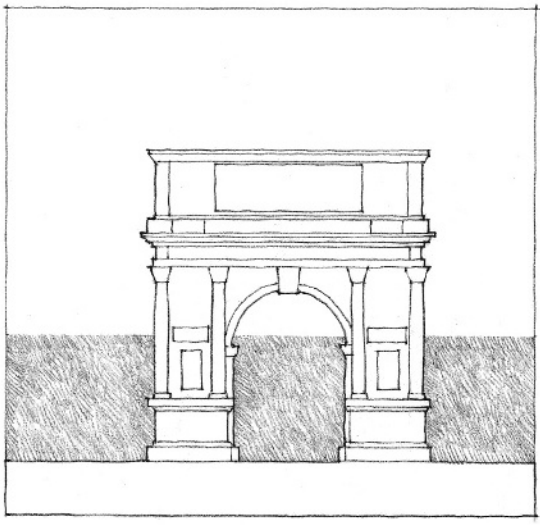
At the threshold of perception, we begin to see parts of a visual field as solid, well-defined objects standing out against a less distinct background. Gestalt psychologists use the term *figure-ground* to describe this property of perception. Figure-ground is an essential concept in the ordering of our visual world: without this differentiation of figure from ground, we would see as if through a fog. A figure emerges from a background when it has certain characteristics.



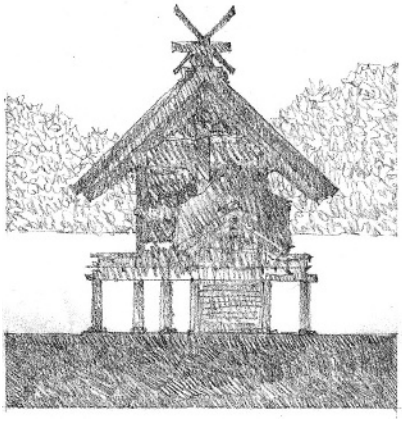
The contour line that borders a figure appears to belong to it rather than to the surrounding background.



The figure appears to be a self-contained object, while its background does not.



The figure appears to advance in front of a continuous, receding background.

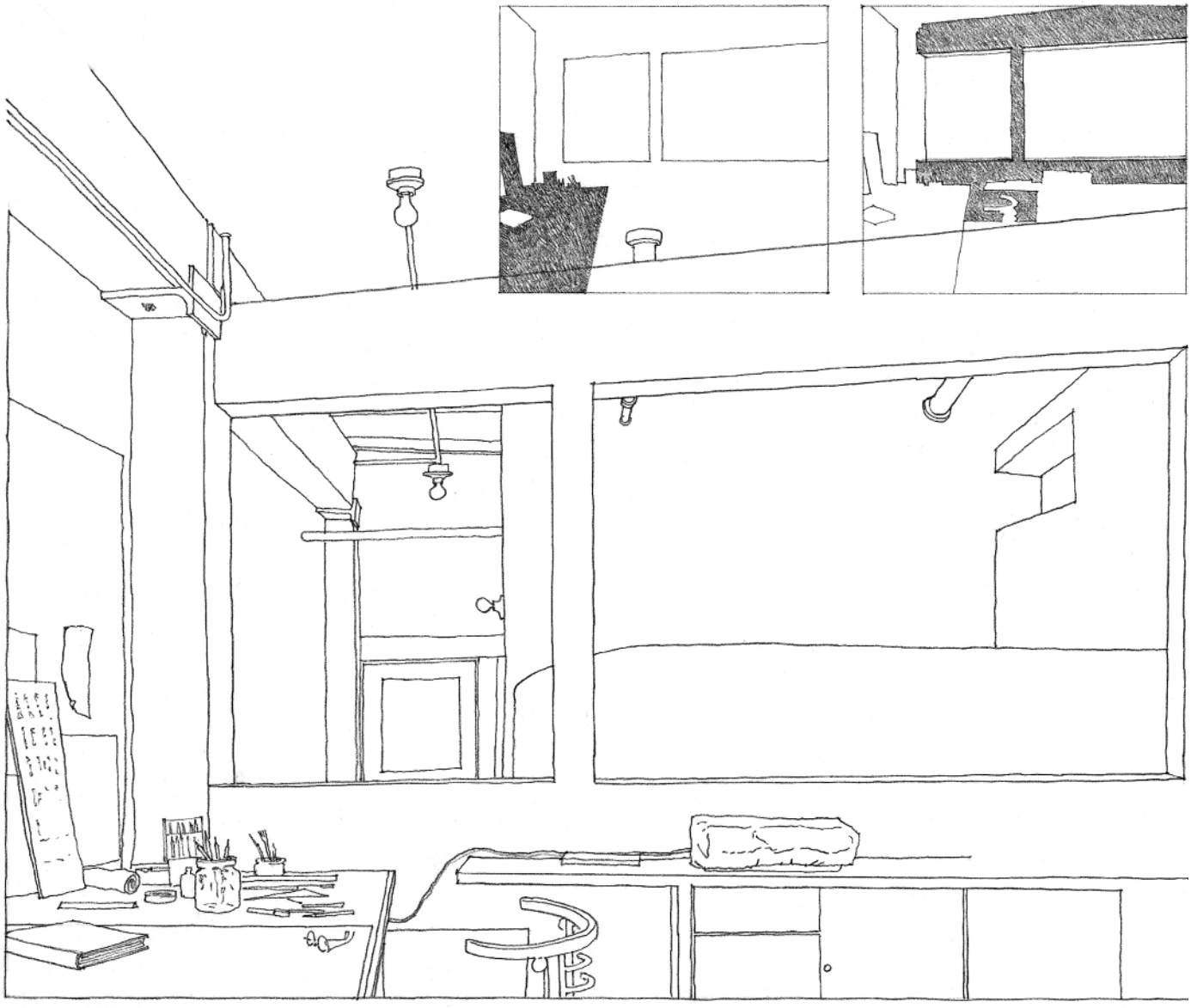


The figure has a color or tonal value that is more solid or substantial than that of the background.

The figure appears to be closer and the background more distant.

The figure appears to dominate its field and be more memorable as a visual image.

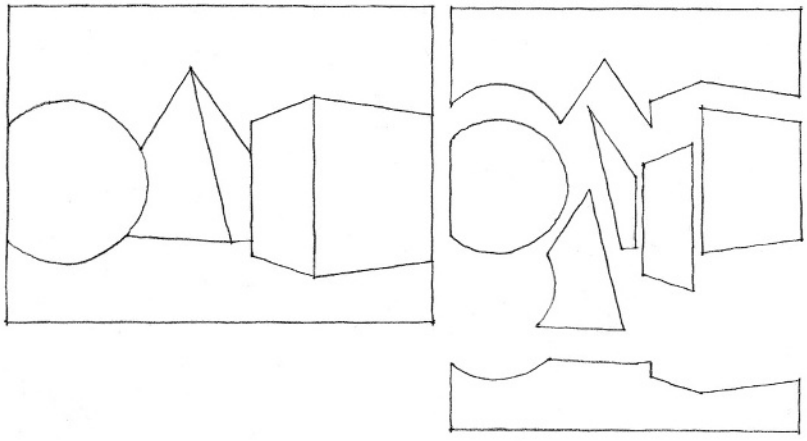
The visual environment is in reality a continuous array of figure-ground relationships. No part of a visual field is truly inert. A thing becomes a figure when we pay attention to it. When we fix our gaze on a book on a crowded desk, it becomes a figure while the rest of the desktop dissolves into the background. As we shift our awareness to another book, a stack of papers, or a lamp, each can become a figure seen against the ground of the desktop. Broadening our view, the desk can be seen as a figure against the ground of a wall, and the wall can become a figure seen against the enclosing surfaces of the room.



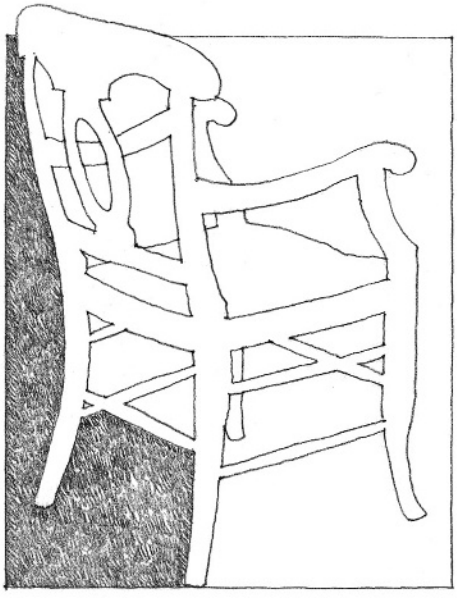
POSITIVE AND NEGATIVE SHAPES

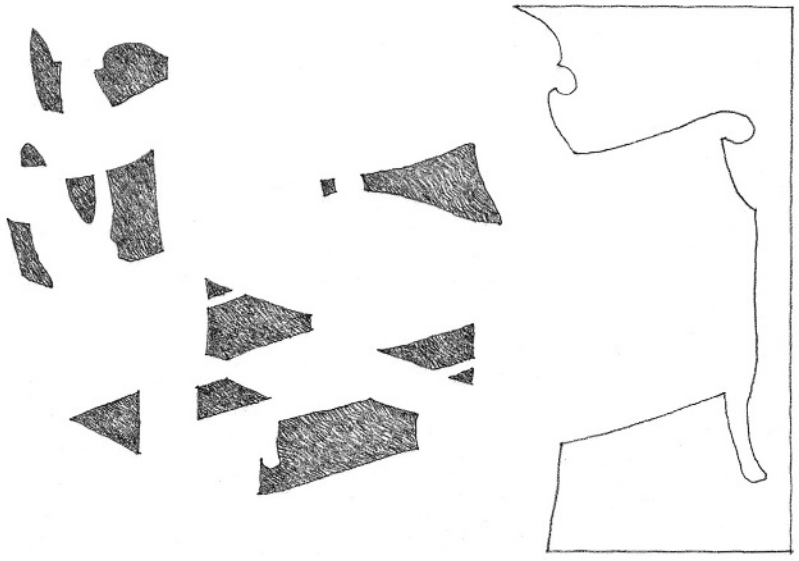
A figure that we can see relatively clearly against a background is said to have a positive shape. By comparison, the figure's rather shapeless background is said to have a negative shape. The positive shapes of figures tend to advance and be relatively complete and substantial, while their background appears to recede and be comparatively incomplete and amorphous.

We are conditioned to see the shapes of things rather than the shapes of the spaces between them. While we normally perceive spatial voids as having no substance, they share the same edges as the objects they separate or envelop. The positive shapes of figures and the shapeless spaces of backgrounds share the same boundaries and combine to form an inseparable whole—a unity of opposites.



In drawing, also, negative shapes share the contour lines that define the edges of positive shapes. The format and composition of a drawing consists of positive and negative shapes that fit together like the interlocking pieces of a jigsaw puzzle. In both seeing and drawing, we should raise the shapes of negative spaces to the same level of importance as the positive shapes of figures and see them as equal partners in the relationship. Since negative shapes do not always have the easily recognizable qualities of positive shapes, they can be seen only if we make the effort.



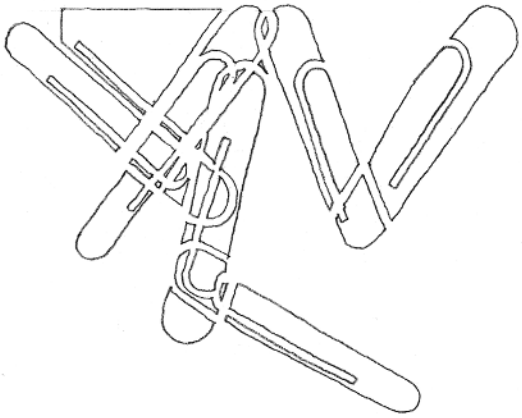


Exercise 1.4

Copy these letter shapes line by line using the guidelines provided. Drawing something upside-down compels us to be less concerned with its identity and more focused on the shapes of the contours and spaces we see.

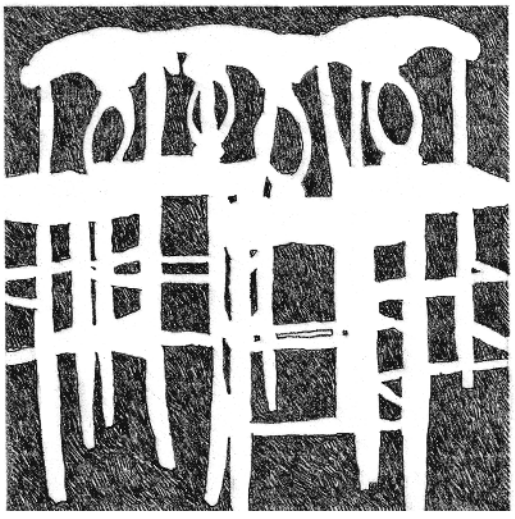
Exercise 1.5

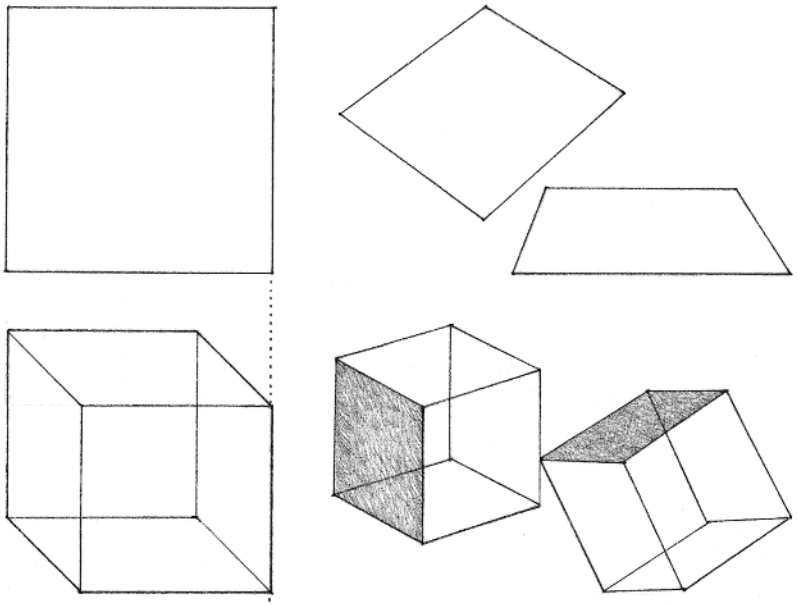
Place several paper clips on a sheet of paper, overlapping them to create a number of interesting spaces. Using a sharp, soft pencil or fine-tipped black pen, focus on and draw the shapes of the paper surface you see within and in between the paper clips. Do similar drawings of negative shapes by substituting compositions of small objects that have notched, indented, or complex profiles, such as leaves, keys, or silverware.



Exercise 1.6

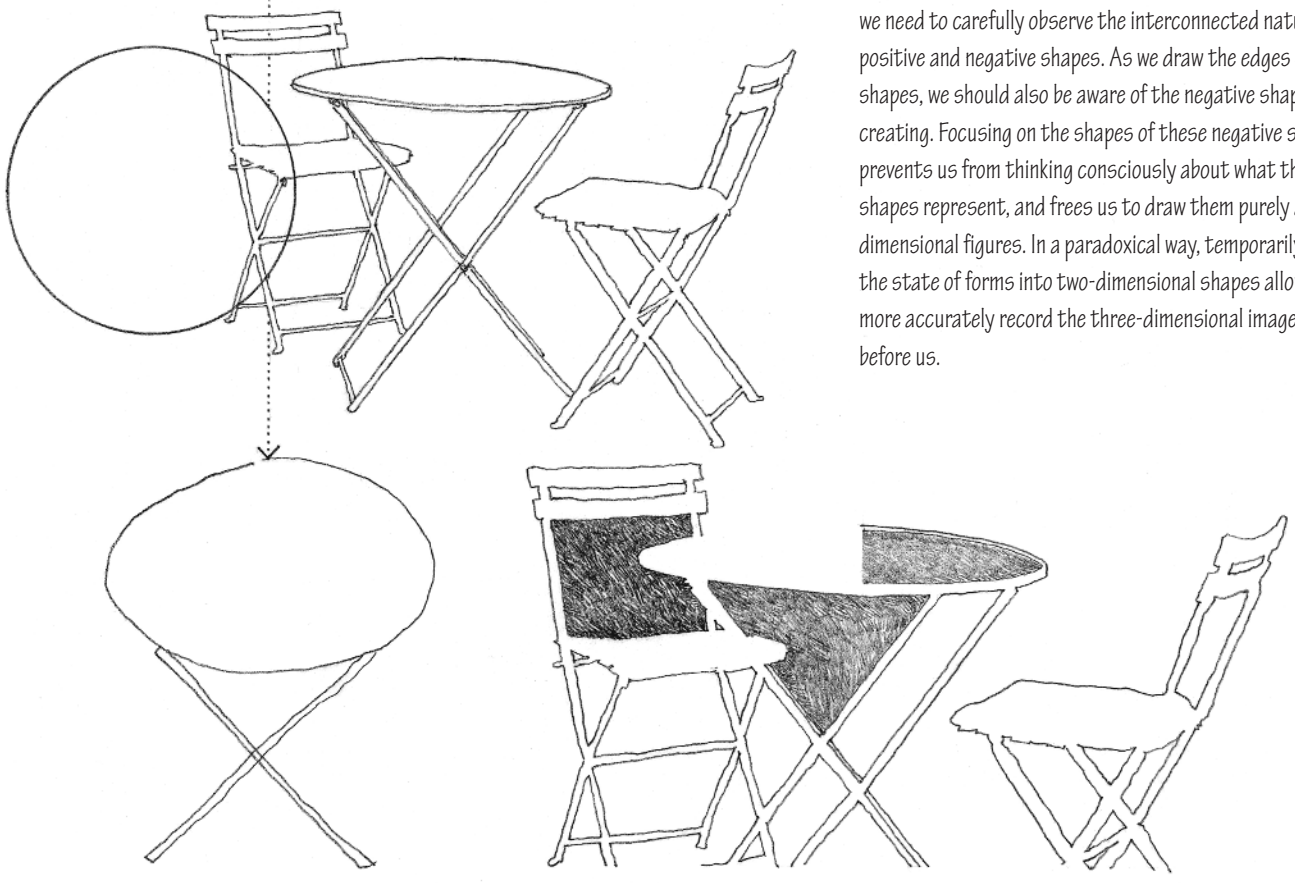
Compose several chairs containing openings within their form. Overlap them to create interesting spaces. Using a sharp, soft pencil or fine-tipped black pen, focus on and draw the shapes of the negative spaces created by the overlapping chairs.





• Objective reality

• Optical reality



What we draw is often a compromise between what we know of an object and the optical image we see.

The perceived shape of an object is necessarily altered or transformed by viewing distance and angle. This may simply be a change in size or a more complex transformation of formal relationships. We can nevertheless identify things even when the particular images we see shift and move in our perception. This phenomenon, known as shape constancy, enables us to grasp the structural features of something irrespective of the perceptual phenomena we experience.

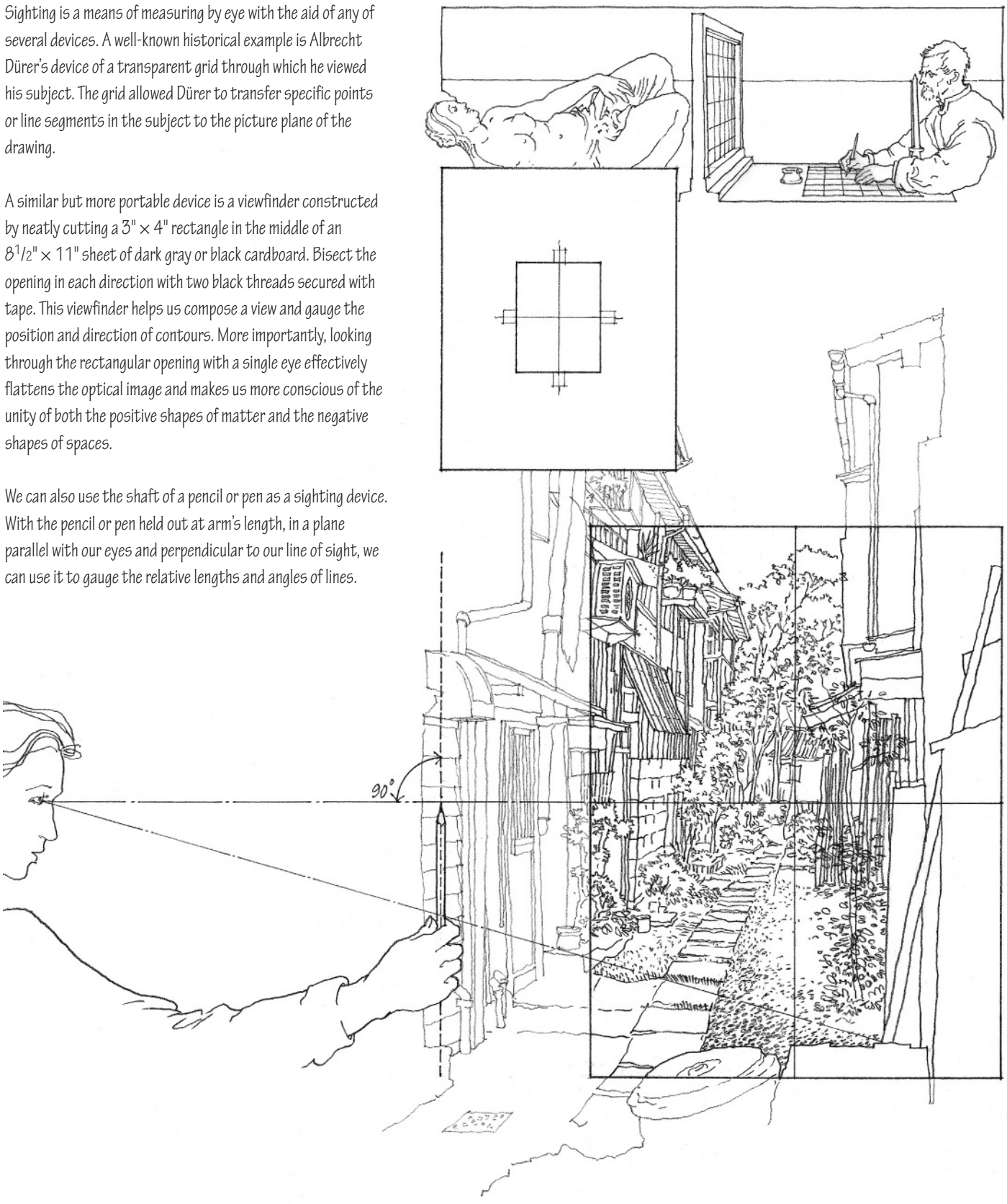
What we know about an object, however, often interferes with our drawing of how its shape appears to the eye. For example, we may be inclined to draw a foreshortened shape in a way that suggests that we are seeing it from above or from the side. Although a round tabletop manifests itself as an elliptical shape, we may be disposed to draw it as a circle. While none of the faces of a cube appear to the eye to be square shapes, we may tend to draw one or more faces as squares.

To avoid drawing a preconceived notion of a class of forms, we need to carefully observe the interconnected nature of positive and negative shapes. As we draw the edges of positive shapes, we should also be aware of the negative shapes we are creating. Focusing on the shapes of these negative spaces prevents us from thinking consciously about what the positive shapes represent, and frees us to draw them purely as two-dimensional figures. In a paradoxical way, temporarily flattening the state of forms into two-dimensional shapes allows us to more accurately record the three-dimensional image we see before us.

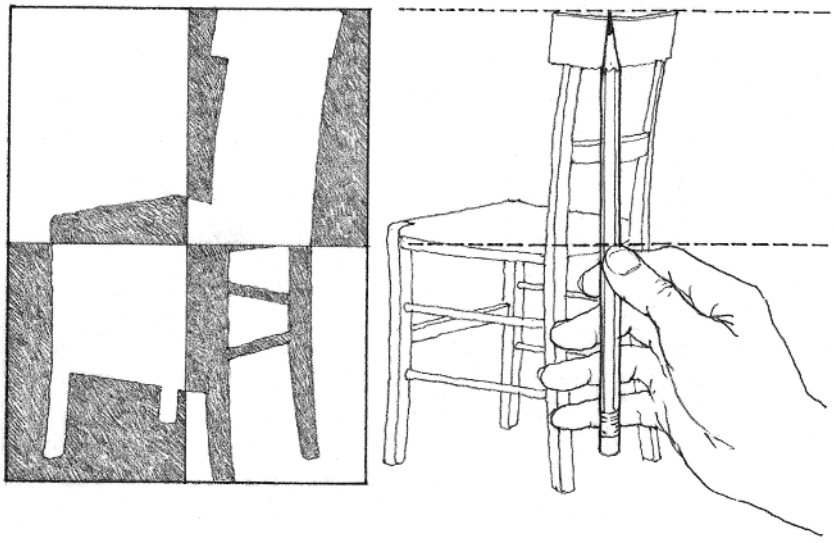
Sighting is a means of measuring by eye with the aid of any of several devices. A well-known historical example is Albrecht Dürer's device of a transparent grid through which he viewed his subject. The grid allowed Dürer to transfer specific points or line segments in the subject to the picture plane of the drawing.

A similar but more portable device is a viewfinder constructed by neatly cutting a 3" × 4" rectangle in the middle of an $8\frac{1}{2}$" × 11" sheet of dark gray or black cardboard. Bisect the opening in each direction with two black threads secured with tape. This viewfinder helps us compose a view and gauge the position and direction of contours. More importantly, looking through the rectangular opening with a single eye effectively flattens the optical image and makes us more conscious of the unity of both the positive shapes of matter and the negative shapes of spaces.

We can also use the shaft of a pencil or pen as a sighting device. With the pencil or pen held out at arm's length, in a plane parallel with our eyes and perpendicular to our line of sight, we can use it to gauge the relative lengths and angles of lines.



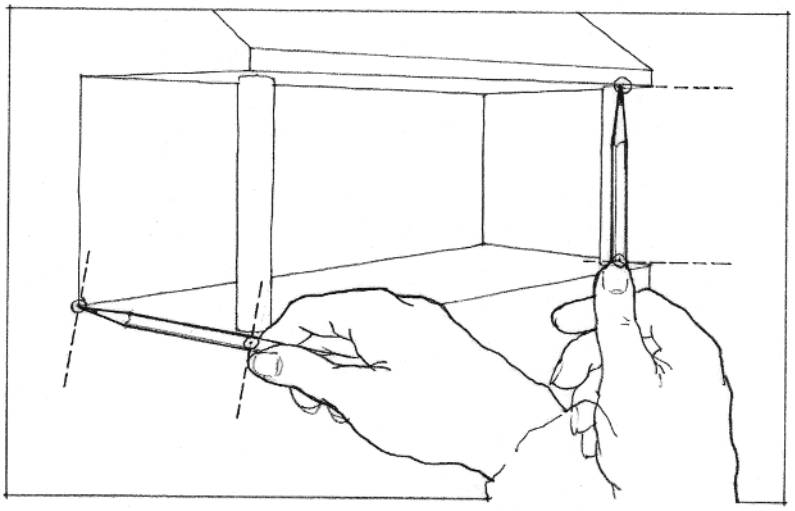
SIGHTING TECHNIQUES

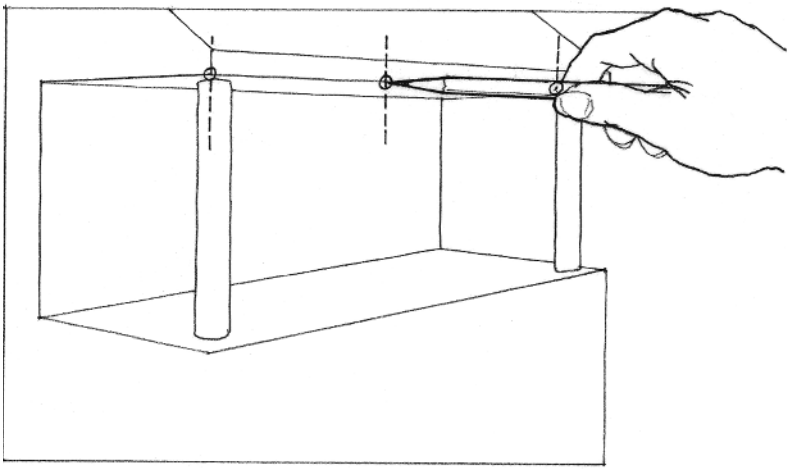


We can use either the viewfinder or the shaft of a pen or pencil to measure and compare the relationships of points, lengths, angles, and alignments in what we see and draw.

Finding the midpoint of the image is a simple matter of using the crosshairs of the viewfinder. Dividing the image into halves helps to place the image on the sheet of paper and sharpens our perception of shapes. To find the midpoint of a shape or group of shapes, we use the shaft of the pen or pencil to first estimate where the center is. Then we check to see if one half equals the other.

To make a linear measurement, we align the pencil's tip with one end of a line we see and use our thumb to mark the other end. We then shift the pencil to another line and, using the measurement as a unit of length, gauge the second line's relative length. We normally use a short line segment to establish the unit of measurement so that other, longer line segments are multiples of that unit.

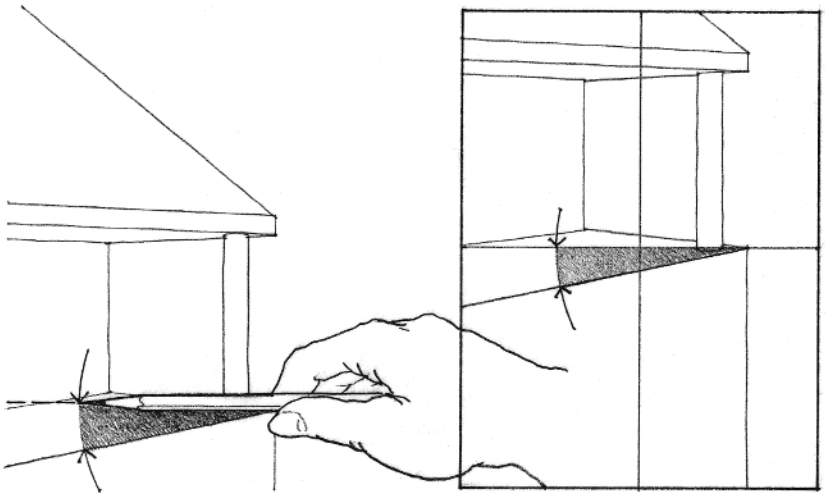


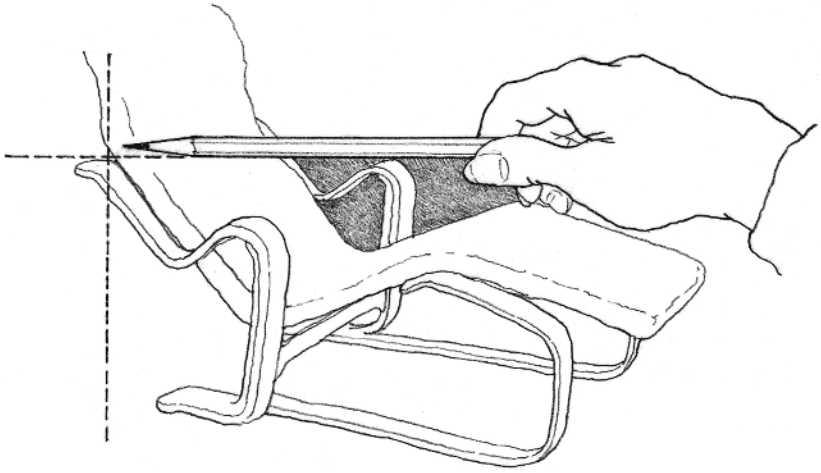


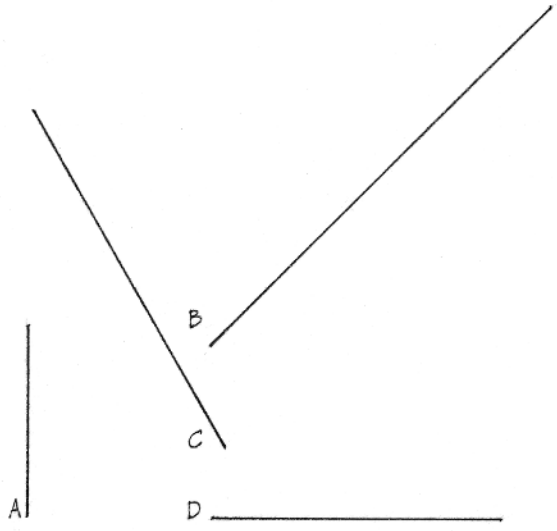
To gauge the apparent slopes or angles of lines, we use vertical and horizontal lines. These reference lines may be the edges or crosshairs of the viewfinder, or the shaft of the pen or pencil held horizontally or vertically at arm's length. We align one end of an angled line with the vertical or horizontal reference line and visually gauge the angle between the two. We then transfer this angular measurement to the drawing, using as guides the edges of the drawing surface that correspond to the horizontal and vertical reference lines.

We can also use the same reference lines to see which points in the image align vertically or horizontally with other points. Checking alignments in this way effectively controls the proportions and relations of both positive and negative shapes.

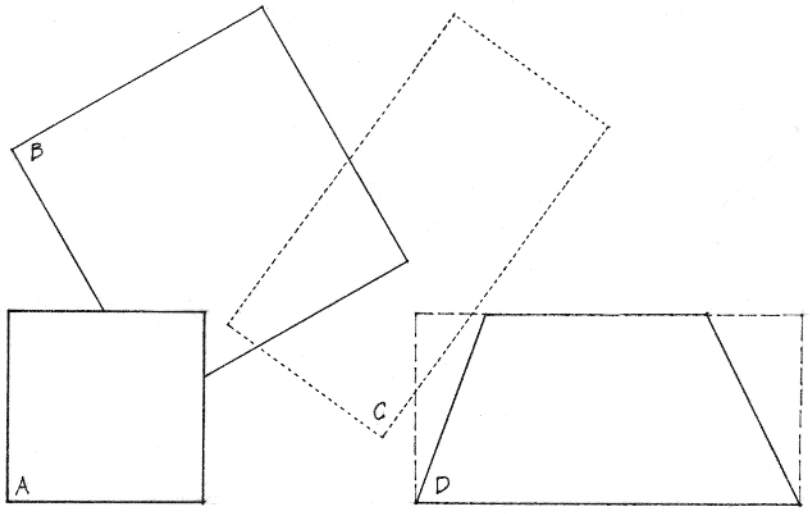
With training and experience, we can learn sighting techniques without an external device, such as a viewfinder or pencil. Instead, we can develop the ability to measure the dimensions of a form and gauge relationships with our eyes alone. To do this, we must be able to hold in our mind's eye a visual measuring stick, based on one aspect of a form. We can then project this image over other parts or aspects of what we are drawing. When making visual judgments, it is important that any preliminary assumptions be checked against what we actually see. When drawing from the imagination or memory, we must be able to evaluate what we have drawn in light of what we want to convey.



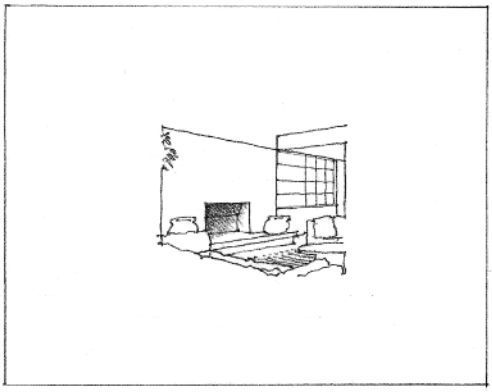




If line A is one unit length, how many units long is line B? Line C? Line D?



If A is a square, what proportion is rectangle B? Rectangle C? The rectangle that encloses the quadrilateral D?



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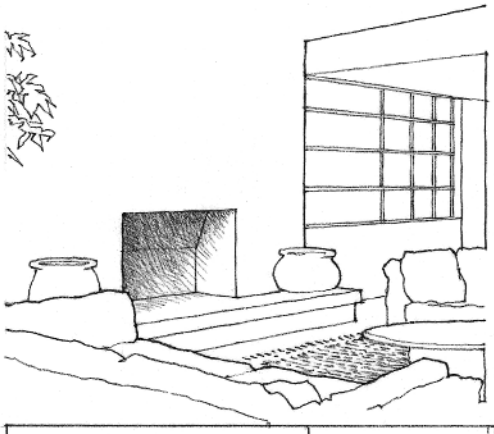

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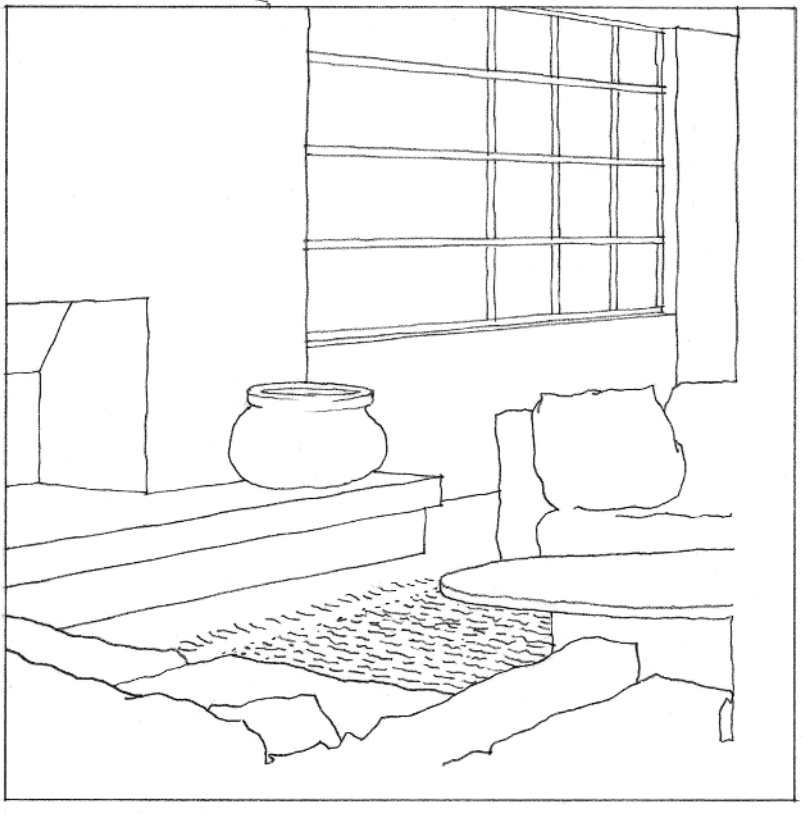
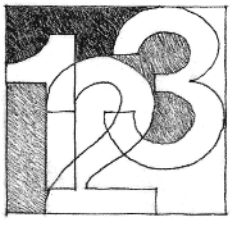


Organizing the composition of a drawing or design is basically the arrangement of shapes. When we begin to draw on a piece of paper, we face decisions as to how large the image will be, where it will be, and what orientation it will have, relative to the size, shape, and edges of the sheet. We also have to determine what is to be included and what is to be omitted from what we see or envision. These decisions affect the way we perceive the resulting figure-ground relationships between positive and negative shapes.

When a figure floats, isolated in a sea of empty space, its presence is emphasized. This type of figure-ground relationship is easy to see. The figure stands out clearly as a positive shape against an empty, diffuse, and shapeless background.

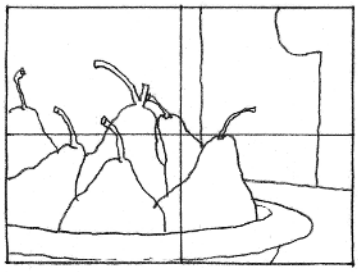
When a figure crowds its background field or overlaps other figures in its field, it begins to organize the surrounding spaces into recognizable shapes. A more interactive and integrated figure-ground relationship develops. Visual movement occurs between positive and negative shapes and the resulting visual tension creates interest.

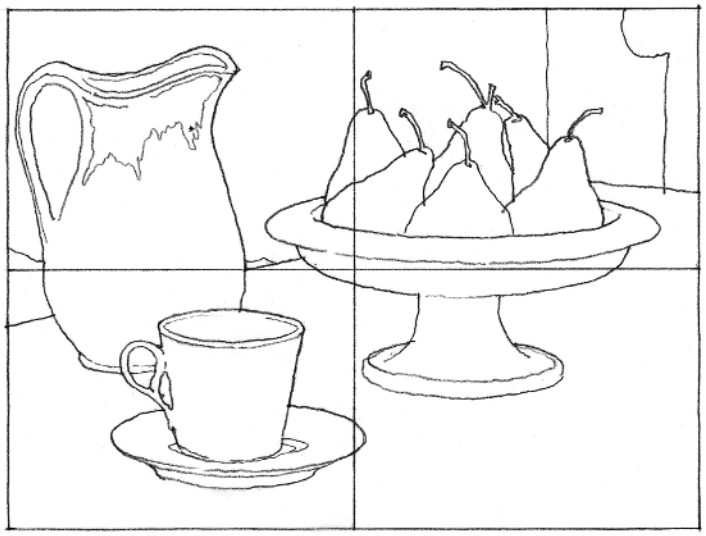
When figures and background both have positive shape qualities or when we render overlapping shapes transparently, then the figure-ground relationship becomes ambiguous. Initially, we may see certain shapes as figures. Then, with a shift in view or understanding, we might see what were formerly background shapes as the positive figures. This ambiguous relationship between positive and negative shapes can be desirable in certain situations and distracting in others, depending on the purpose of a drawing. Any ambiguity in a figure-ground relationship should be intentional, not accidental.



Exercise 1.7

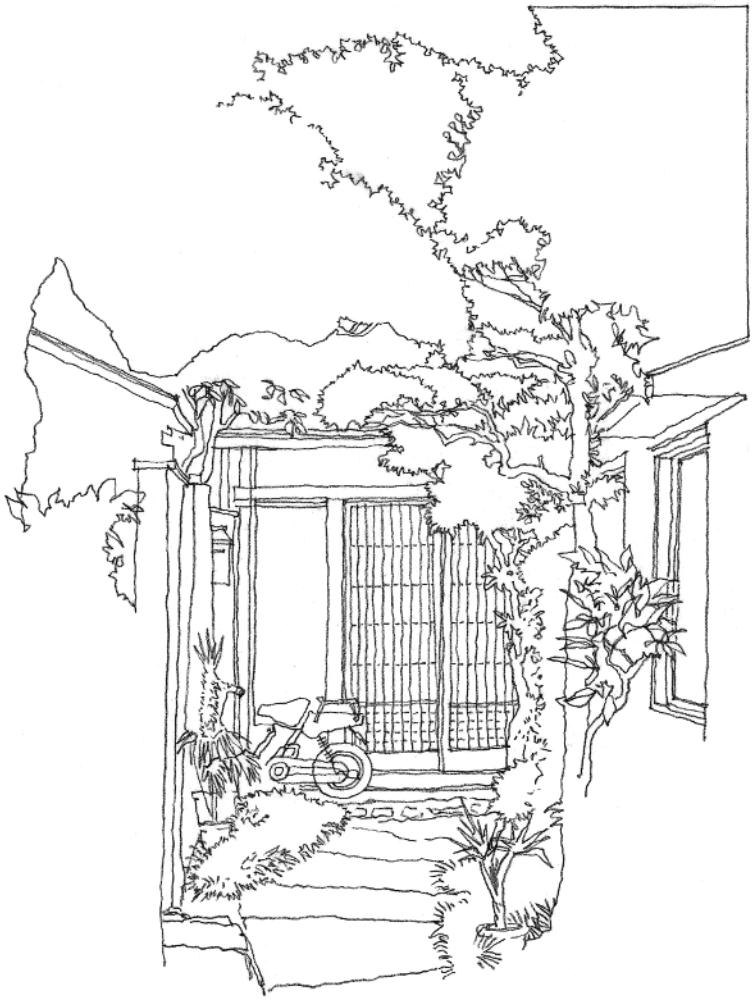
Arrange a still life of objects and use your viewfinder to study alternative compositions. Vary your viewing distance to create an isolated figure against a shapeless background, an interactive figure-ground pattern of shapes, and finally, a composition of ambiguous figure-ground relationships.

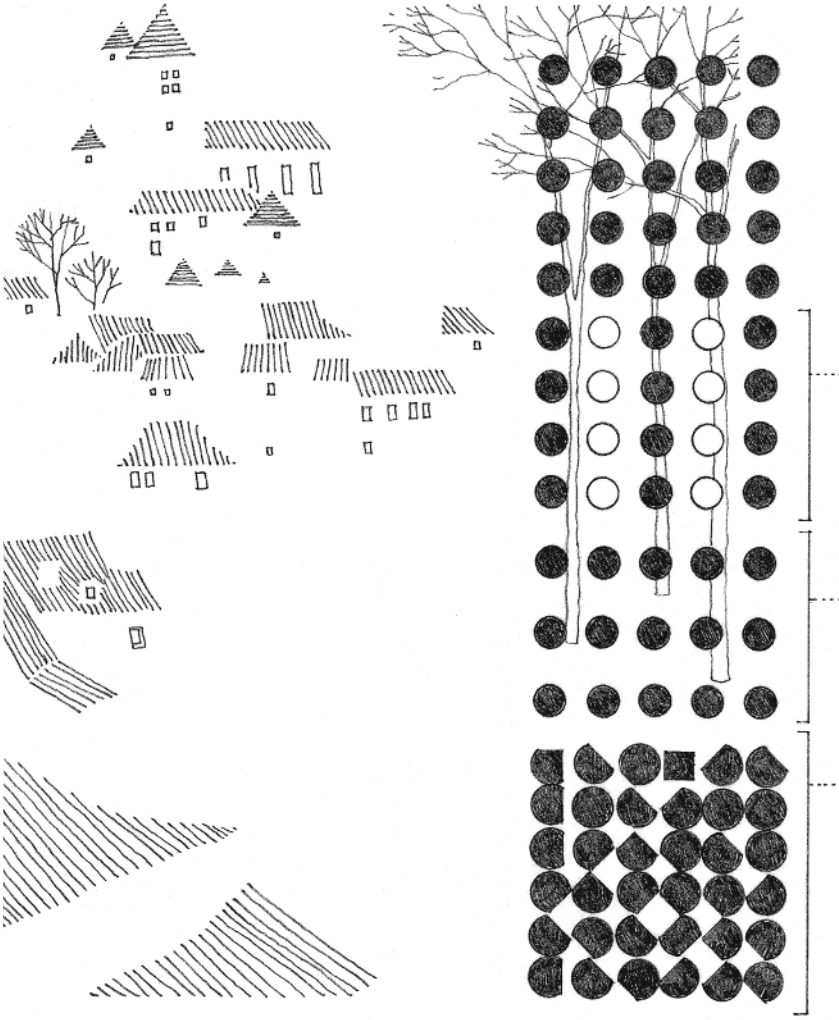




Exercise 1.8

Do similar studies of how you might frame an outdoor scene to create a vignette, an interactive figure-ground pattern of shapes, and finally, a composition of ambiguous figure-ground relationships.





A Search for Pattern

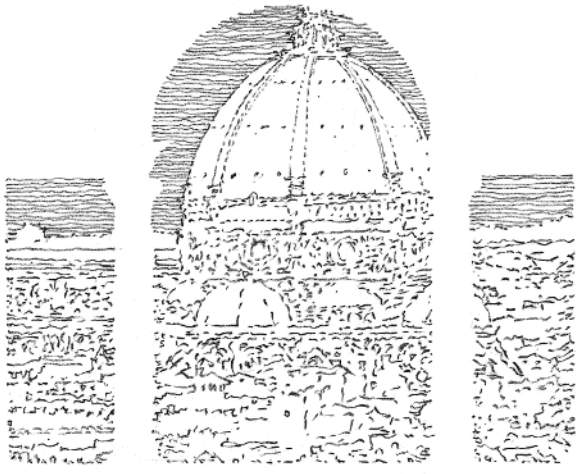
What we see and draw often consists of a complex composition of lines and shapes. There may exist not one but a whole array of interrelated sets of figure-ground patterns. How do we make sense of such a complex visual field? We see not individual shapes, but rather a pattern of relationships. According to the Gestalt theory of perception, we tend to simplify what we see, organizing complex stimuli into simpler, more holistic patterns. This grouping can occur according to certain principles.

- Similarity
  We tend to group things that have some visual characteristic in common, such as a similarity of shape, size, color, detail, alignment, or orientation.

- Proximity
  We tend to group elements that are relatively close together, to the exclusion of those farther away.

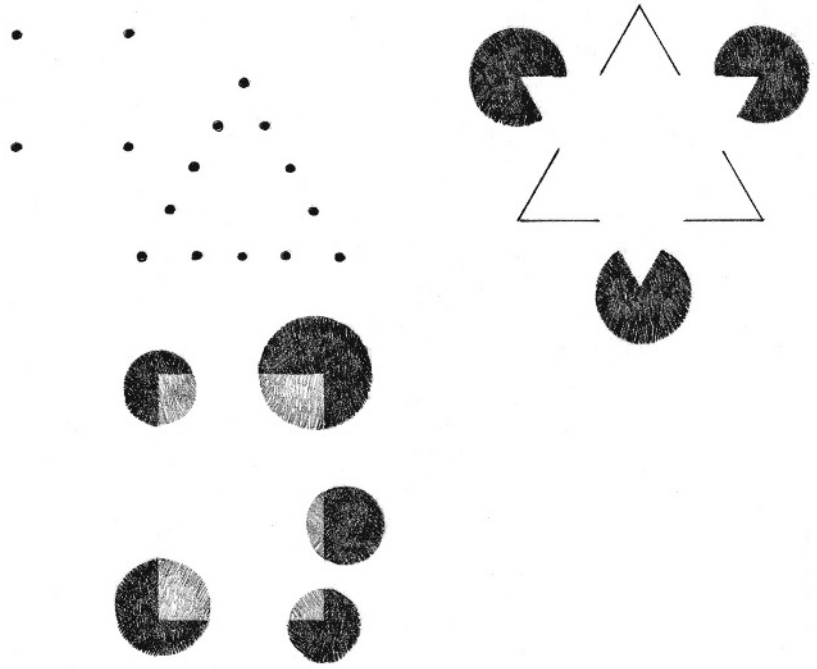
- Continuity
  We tend to group elements that continue along the same line or in the same direction.

These perceptual tendencies lead us to see the relationships between the graphic elements of a composition. If these relationships form a relatively regular pattern of shapes, then they can organize a complex composition into a perceptually simpler and more comprehensible whole. The principle of grouping thus helps promote the coexistence of unity, variety, and visual richness in a drawing.



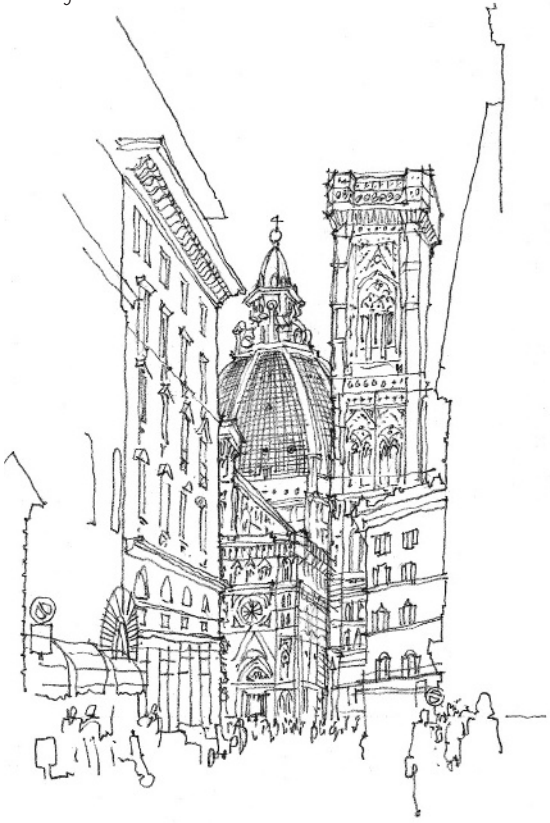
A Search for Stability

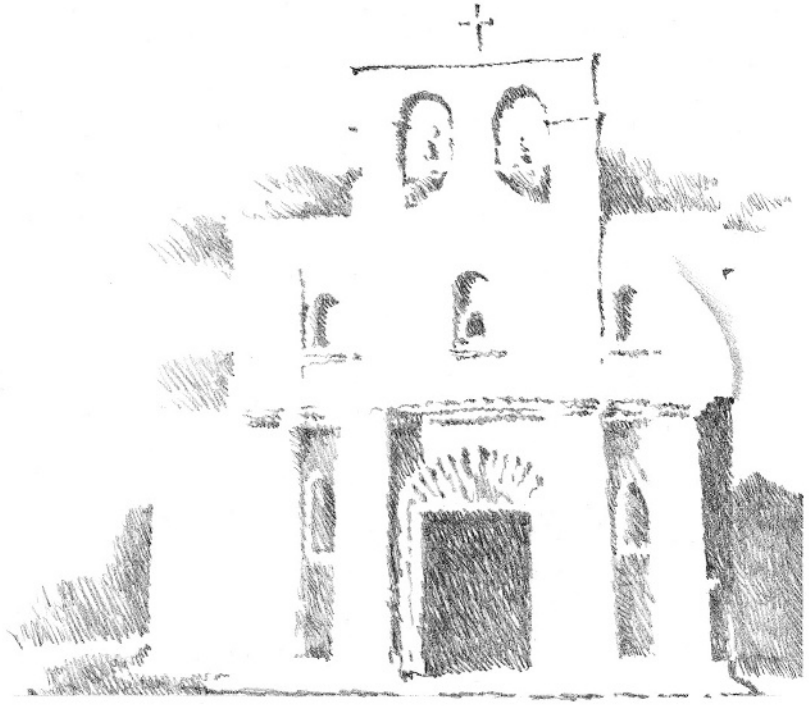
Closure refers to the tendency for an open or discontinuous figure to be seen as if it were a complete and stable shape. Given a pattern of dots, virtual lines connect the points in such a way that a regular, stable shape results. These lines are similar to the ones that complete a regular shape even when part of that shape is hidden. Incomplete figures tend to complete themselves according to simplicity and regularity of form.



There are situations where, even if a line does not in fact exist, the mind's eye creates the line in an attempt to regularize a shape and make it visible. These seen but nonexistent lines are illusory and have no physical basis. We see them in visual areas that are completely homogeneous. They can be either straight or curved. While they appear to define opaque shapes, the figures can also be transparent. In any case, what we tend to perceive are the simplest, most regular structure of lines that can complete the shape we see.

The principle of closure prompts the viewers of a drawing to mentally complete interrupted lines and fill in discontinuous shapes. We can therefore use this property of perception to suggest shapes without actually drawing them. This can lead to a more economical use of line and greater efficiency in drawing.





What do you see in this pattern of light and dark shapes?

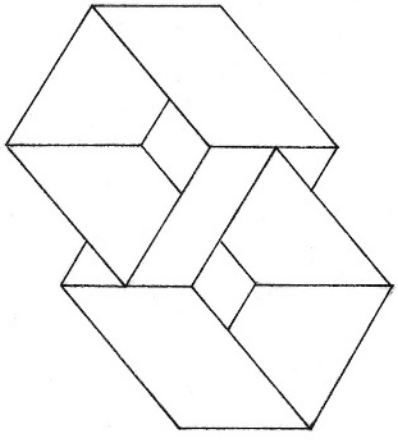
Drawings do not speak for themselves. What possible meanings could this drawing have for the viewer?

A Search for Meaning

The grouping principles of similarity, proximity, and continuity operate without regard for representational meaning. They aid us in organizing even the most abstract patterns. Because the mind's eye constantly searches for meaning in what we see, we also tend to group shapes into familiar images.

Merely looking at an apparently amorphous shape can sometimes bring to a prepared, interested, and searching mind a more specific image. In its search for meaning, the mind's eye imagines and projects familiar images onto seemingly shapeless patterns until it finds a match that makes sense. It attempts to complete an incomplete pattern, or find a meaningful pattern embedded in a larger one, in accordance with what it already knows or expects to see. Once seen and understood, it is difficult to not see the image.

The manner in which the mind assigns meaning to what it encounters is often unpredictable. We must therefore be continuously aware that others may see something other than what we intend or expect them to see in our drawings.

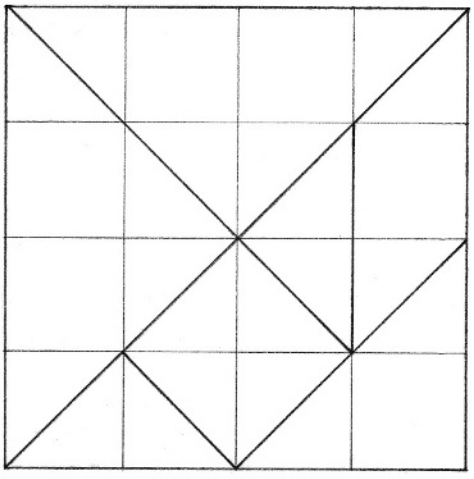


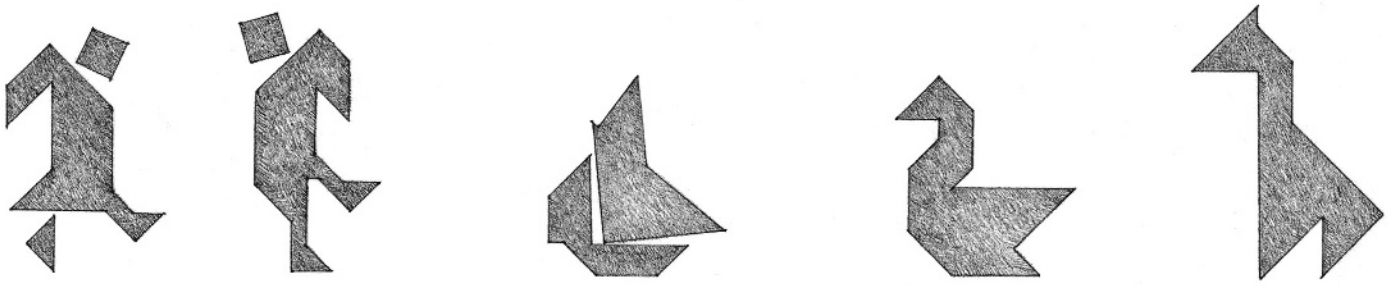
Exercise 1.9

Exercise your mind's tendency to project meaning onto unfamiliar or ambiguous images. How many different things can you see in this inkblot?

Exercise 1.10

A tangram is a Chinese puzzle consisting of a square cut into five triangles, a square, and a rhomboid, which can be reassembled into a great variety of figures. Make a copy of the tangram and cut apart on the heavy lines. Can you arrange the pieces to form the examples? How many other identifiable patterns can you form?





"...when you look at a wall spotted with stains, you may discover a resemblance to various landscapes, beautified with mountains, rivers, rocks, trees.... Or again you may see battles and figures in action, or strange faces and costumes and an endless variety of objects which you could reduce to complete and well-known forms. And these appear on such walls confusedly, like the sound of bells in whose jangle you may find any name or word you choose to imagine."
—Leonardo da Vinci