Lovejoy, Margot. *Digital Currents: Art in the Electronic Age*
selection from Chapter 1, Vision, Representation, and Invention

Vision and art

Vision is one of the most powerful of the senses. Seeing is related to art through a system we call *representation,* a complex term which allows us to examine significant aspects of art practice. Images are not just simple imitations of the world, but are always reordered, refashioned, styled, and coded according to the different conventions which develop out of each medium and its tools - sculpture, painting, printmaking, photography, video, and computer amongst others. However, the way we see is shaped by our worldview, which governs our understanding of what representation is. Thus we can say that representation is a form of ideology because it has inscribed within it all the attitudes we have about our response to images and their assimilation; and about art-making in general, with all its hierarchies of meaning and intentionality.

A useful construct for examining the distinction between vision and representation is provided in an interesting current book by contemporary art historian Svetlana Alpers, *The Art of Describing: Dutch Art in the 17th Century?* Here she compares the differences in attitudes between Dutch and Italian Renaissance artists toward representation. Italian forms of representation were based in the humanistic textual worldview of the Renaissance with its conceptual notions of perfect beauty and poesis. Artists' selections from nature were chosen with an eye to heightened beauty and mathematical harmony - an ordering of what was seen according to the informed choices and judgment of the artist based on particular issues and concepts rather than as a form of representation where the single most important reference is the natural appearance of things. It reflected the views of Plato as articulated in texts such as the *Republic* (Books VI, VII, and X). Plato regarded imagination and vision as inferior capacities, a product of the lowest level of consciousness. He believed that reason allows us to contemplate truth, while the products of vision and imagination can present only false imitations, part of the irrational world of illusion and belief inferior to philosophy and mathematics which he designated as higher forms of knowledge. He illustrated his ideas using the example of a bed, postulating that there are three kinds of beds: one the essential concept of the bed, created by God; then that of a real bed made by a carpenter trying to make ultimate reality; finally, the artist's representation of it which stands removed from its reality. For Plato, human vision and imagination are based in imitation, and thus never able to claim access to divine truth. Plato mistrusted and opposed visuality and imagination through his fear that

various forms of mythology, where life was defined as a series of relationships between human beings and various deities, could become dominant ones. He held that the basis *for* understanding human existence was through reason and the mind. Imagination and the images produced by it could be trusted only if, first, they were deemed to be imitations, never original; second, they were subordinate to reason; and third, they served the Good and the True. His need to create boundaries around the cultural legitimacy of products of the imagination was meant only as a means of protection for the "greater good." Reflecting Platonic ideals, in its rejection of a visual culture, Italian culture was based in a textual one - a search for truth, meaning, and knowledge.

By contrast, according to Alpers, Dutch seventeenth-century Renaissance painting reflected an acceptance of technologically assisted seeing. Over several epochs in Holland, experiments had been carried on to perfect the accuracy of mechanically assisted means of seeing such as the optical lens. Confidence in technology and cultural acceptance of this form of research into technological visualization in confirming and extending sight through microscopic close-ups, reflections, and distant enhanced views was understood as the way to new and potent forms of knowledge. Such commitment became the basis for a more visually oriented culture based in objective, material reality. Dutch paintings of this period focus on a world seen, a straightforward rendering of everyday life, based on observation, sometimes with the aid of the camera obscura lens, with all the spatial complexity and social detail of real interior views. Meaning in them is not "read" as in Italian painting, but rather the paintings are energized by a system of values in which knowledge of the contemporary external material world is "seen" as a means for understanding.

In this sense, Dutch painting can be said to reflect the views of Aristotle,[3] who was confident about the value and importance of vision and the direct observation of nature and taught that theory must follow fact. In his view, form and matter constitute individual realities (whereas Platonic thought posits that a concrete reality partakes of a form - the ideal - but does not embody it). Aristotle taught that knowledge of a thing beyond its description and classification requires an explanation of "why it is" and posited four principles of explanation: its function; its maker or builder; its design; the substance of which it is made. Also, he characterized imagination as a precondition for reason, describing it as a "mediating sensory experience

Figure 1.2 Albrecht Durer, *Untitled,* 1538. woodcut.

Artists have always designed their own tools for creating the two-dimensional illusion on paper or canvas of what they see. such as this early grid with a sighting eyepiece.

rather than the experience which Plato thought would lead only toward dangerous illusions."[4] For Aristotle, imagining is based in the visual. Imagination lies between perception and thinking because it is impossible to think without imagining. Picturing in the mind, such as abstract forms or flashes of reality, accompanies abstract ideas, and thinking cannot proceed without such imaginings. Believing that imagination is not only a mediator between sensation and reason, Aristotle understood that it could also rearrange sense perception to form new ideas. It is essential in understanding abstract conceptions that go beyond human experiences of space and time to imagine the future.

Between these two poles of thought, many different positions exist. Even though some Italian artists used optical devices in the production of their work, what they saw was informed by their philosophical attitudes. Reality can be an abstraction depending on the mindset of the artist despite the mechanical device one may be observing through. The distinction we must draw between Dutch and Italian painting lies in the differences between their outlooks and methods inscribed within their worldviews which define their approach to representation. We can draw a comparison between Vermeer's use of the camera obscura and Italian artists such as Bellotto, Guardi, Crespi, Zucarelli, and Canaletto. all of whom used it as an aid in preparing their drawings and paintings.

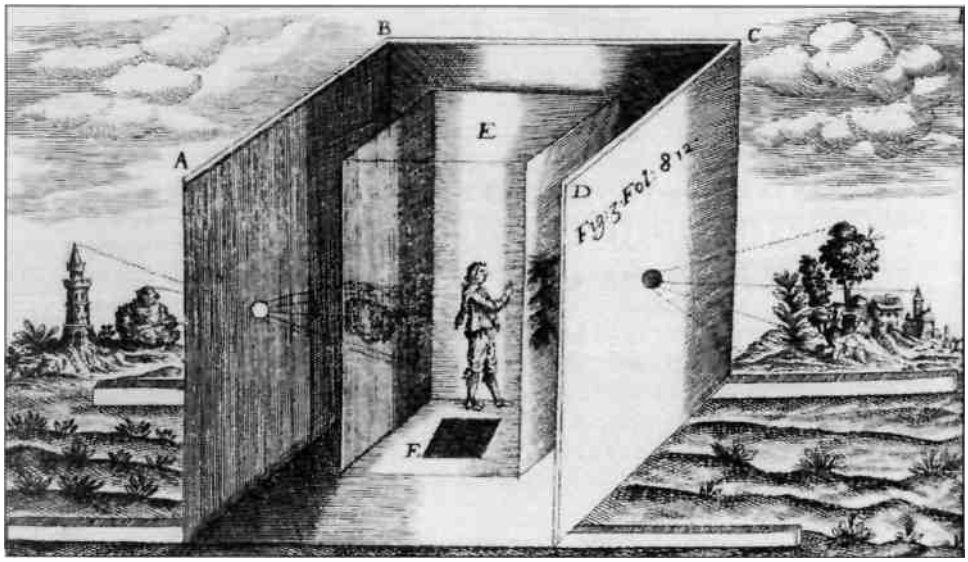

Figure 1.3. Early camera obscura, from A. Kircher. *Ars Magna Lucis et Umbrae,* 1645.

The camera obscura was recorded by Aristotle (384-322 BC) and was well known to Arabs in medieval times. Leonardo described it in his *Codex Atlanticus.* "When the images of illuminated objects pass through a small round hole into a very dark room, if you receive them on a piece of white paper placed vertically in the room at some distance from the aperture, you will see on the paper all those objects in their natural shapes and colors. They will be reduced in si/e and upside down, owing to the intersection of the rays at the aperture. If these images come from a place which is illuminated by the sun, they will seem as if painted on the paper."

{Collection Boston Athenaeum]

Art historian Charles Seymour has shown that the optical effects in Vermeer's paintings are the direct result of aided viewing and recording of phenomena that could be seen only in conjunction with a camera obscura. Seymour describes Vermeer's *View of Delft*

> The highlights spread into small circles, and in such images the solidity of the form of a barge for example, is disintegrated in a way that is very close to the well-known effect of circles (or disks) of confusion in optical or photographic terms. This effect results when a pencil of light reflected as a point from an object in nature passes through a lens and is not resolved, or "brought into focus" on a plane set up on the image side of the lens. In order to paint this optical phenomenon, Vermeer must have seen it with direct vision (through the camera obscura) for this is a phenomenon of refracted light.[5]

The aforementioned Italian painters, although known for their use of the camera obscura, simply used the device as a reference tool for placement accuracy without incorporating any of its effects directly into their landscape painting. Considerably more information on the use of mechanical aids in Renaissance painting is now available as a result of the research of British artist David Hockney in his recently published *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters.*

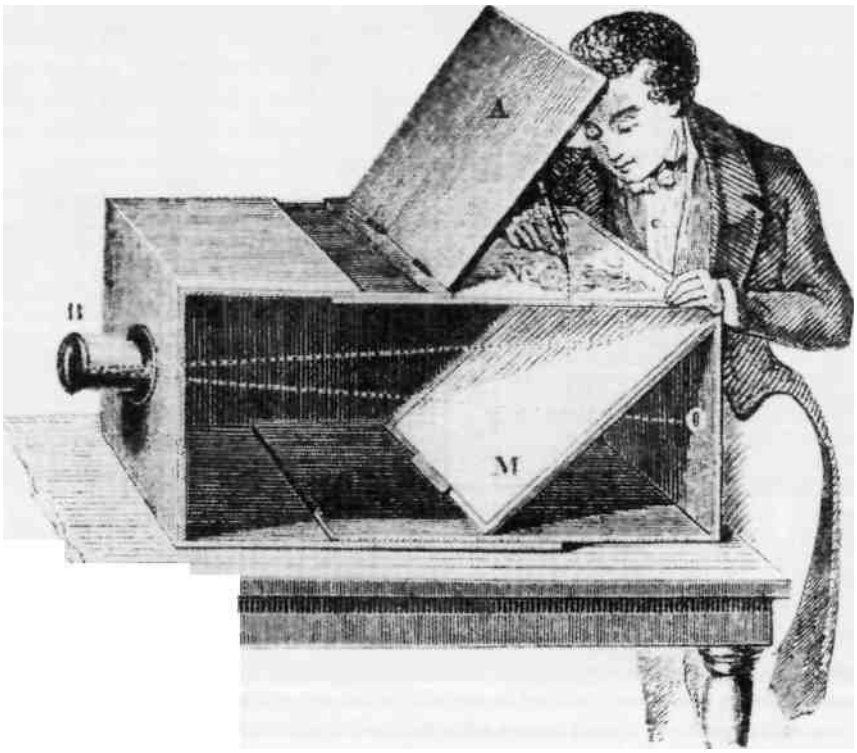

Figure 1.5. Camera lucida. circa eighteenth century.

The camera lucida consisted of a lens arrangement that enabled the artist to view subject and drawing paper in the same "frame," and thus the image that seemed projected on the paper could be simply outlined.

(International Museum of Photography. George Eastman House]

Figure 1.4. (opposite) Camera obscura, circa seventeenth century.

By 1685, a portable camera obscura (in appearance, much like the first cameras) had been invented by Johann Zahn, a German monk. Described as a machine for drawing, this version concentrated and focused the light rays gathered by the lens onto a mirror which then reflected the image upwards where transparent paper was fixed in place for tracing the image. Count Francesco Algarotti confirms the use of the camera obscura as a tool in his 1764 essay on painting: "The best modem painters amongst the Italians have availed themselves greatly of this contrivance; nor is it possible they should have otherwise represented things so much to life. Everyone knows of what service it has been to Spanoletto of Bologna, some of whose pictures have a grand and most wonderful effect." Canaletto. Guardi. Bellotto, Crespi, Zucarelli, and Canale used it as an aid in preparing their drawings and paintings.

(International Museum of Photography, George Eastman House]

These two distinctly different attitudes toward representation have characteristics similar to those distinctions between vision and technological seeing, which today are still important aspects of the discourse about representation.

Science and art converge in the Renaissance in different ways

The incomparable development of the Renaissance art of both the south and the north rested to a large extent on the integration of several new sciences in anatomy, perspective, mathematics, meteorology, and chromatology. Supporting the use southern European Renaissance artists made of these important scientific discoveries lay Platonic convictions about the harmonious structure of the universe, emphasizing the rational relationship between the soul, the state, and the cosmos. Their goal was to reach heightened beauty and harmony as an embodiment of universal meaning and of supreme inner truth. The particular and detailed iconography of northern Renaissance (i.e. Dutch) art reflected their intense interest in the tools of knowledge, those lenses that made it possible for them to observe nature accurately.

Seeking rational solutions for organizing visual information to create the illusion of three-dimensional space on a two-dimensional surface, artists adopted the mathematical principles of vanishing-point perspective discovered by the Florentine architect Brunelleschi in 1420. Through perspective, line, form, and color, the visible experience of nature could be stabilized. As a consequence of the conventions of perspective, images are constructed so that the convergence of mathematically structured vanishing points addresses the central vantage point of the single spectator as being the ideal in the creation of illusion. God's will was connected with the mathematical regularity of optical phenomena. However, as Berger suggests, "the inherent contradiction in perspective was that it structured all images of reality to address a single spectator who, unlike God, could only be in one place at a time."[6]

Another important mathematical consideration influencing artists in capturing the desired harmony and order to be found in the proportions of nature was the golden mean. Derived from the Golden Section, a Platonic strategy used in seeking the ideal of beauty in the designing of the Parthenon, it was confirmed by the Fibonacci series of numbers in the sixteenth century. This harmonious, abstract mathematical proportioning of space continues to be a strong influence in contemporary art, architecture, and the design of everyday objects. In some sense, these mathematical underpinnings toward abstraction in art can be seen as direct antecedents to the mathematical algorithms of the computer.

For Leonardo da Vinci (1452-1519), painting was a humanistic demonstration of universal knowledge. The depth and precision of his theoretical analysis of nature (botanical observations, notes on the turbulence of water and clouds), the drawings of his inventions (submarines, flying machines, engineering schemas), and his drawings of perspective and human anatomy are still stunning to us today. His notebooks are proof of the versatility and universality of his thinking as he attempted to fathom the riddles of human personality and the mysteries of natural phenomena. His painting was an expression for us of the search for the ultimate truth inherent in the human condition. For him, art-making was held in relationship to the concept of man as the measure of the universe. Although he has been called the "the father of technology" and was fully aware of scientific invention, and engineering principles (and understood the relationship of tools to seeing), Leonardo was driven more by philosophic

Figure 1.6. Jan Vermeer, *Young Girl with a Flute.* 1665, 7/8 in. x 7in.

Vermeer's image with its many "circles of confusion" or shimmering unfocused highlights as observed through the camera obscura is part of camera vision, quite different in style and intention from those painted by Italian Renaissance artists. While Vermeer developed a distinctive style by allowing the effects of viewing through the lens to become an active medium in what he painted, Italian Renaissance painters were mainly interested in using the camera obscura as a tool for solving problems of placement and accuracy although they despaired of its foreshortened compressed perspective and limited sense of depth.

(Widener Collection, National Gallery of Art. Washington)

and aesthetic questions in creating his paintings and drawings and did not make direct use of technological devices for his art. In this sense, Leonardo's embrace of knowledge and of the ideal, rather than the direct use of technological tools for his art, anticipate in him, as we shall see, the later contradictions of modernism.

The camera as artificial eye: a new form of representation

During the three hundred years of the use of the camera obscura as an optical mechanical aid before the chemistry of photography was developed, many artists used it to help them in their observation of nature. In the Low Countries, Italy, and France, the camera obscura

enjoyed widespread continuous use throughout the seventeenth, eighteenth, and nineteenth centuries as a convenient tool for artists. The natural phenomenon of the camera obscura, in which light, passing through a lens (in the simplest case, through a pinhole) onto transparent paper can reflect, upside down, the image of nature captured and focused by the lens. Many different styles of "cameras" and optical lenses were designed to address the popular needs of artists to help them in their observations of nature. Other mechanical drawing devices (such as those depicted in Durer's fifteenth-century set of woodcut illustrations), for converting a view of three-dimensional objects into two-dimensional drawings, include sighting devices for foreshortening; an eyepiece and framed grid on transparent glass for portrait sketching; and stringed movable grids for mounting on drawing tables.

By the 1830s, the only missing link for permanently fixing the camera's images on paper was the light-sensitive chemistry of photography. Although scientists and inventors such as Schultze and Wedgwood made contributions to the study of photosensitivity, it was an artist/printer, Joseph Nicephore Niepce, who made the first real breakthrough in the link-up between the optical principles of the camera obscura and light-sensitive chemistry. In 1826 he successfully made an eight-hour exposure on a sensitized pewter plate in a camera -thereby capturing the world's first faint photograph of a scene from his window. However, the follow-up invention of the silver daguerrotype, in 1839, received far more attention.

But it was the British artist/inventor Henry Fox Talbot who succeeded in producing (in 1840) the first truly viable photographic process - the negative/positive system. His method is still in use today because from a single negative an unlimited number of photographic prints can be produced, leaving the negative intact. Talbot called his discovery "photogenic drawing" and later published a book entitled *The Pencil of Nature*.

Because the camera obscura was so related to its use over hundreds of years as an imaging tool for artists, the invention of the fixed images of the photographic process seemed at first an astonishing boon to the art community of the time. In its fullest sense as a revolutionary means of representation as well as a means of reproduction, duplication, and reportage, the camera created a crisis in the art world which became fully evident only a century later.