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Filippo Brunelleschi (1377-1446) publicly revealed his discovery of perspective in Florence, Italy, in 1425.

The event was quite simple, almost playful. Brunelleschi brought a little painting based on his new ideas into the square in front of the cathedral. The original painting has disappeared, but accounts of it and how it was used in the demonstration survive. Despite scholarly dispute over details of the event, its main features are clear.[1]

Brunelleschi's Experiment: The Duplication of Sight

The scene in front of the cathedral on that August day in 1425 must have been puzzling. People were used to seeing Brunelleschi around the cathedral; its magnificent dome was then being constructed according to his design and under his supervision. But on that day he was not involved with the dome. A crowd of passersby stood in line. He gave each of them, one after the other, a small mirror and a small painting (**3.1**). What each one did with the painting and the mirror seemed very strange. Each person put the back of the painting up to one eye and looked through a hole in the painting's center, then held a mirror in front of the painting so that the painting itself was seen (through the hole) reflected in the mirror.

3.1 Experimenting with perspective.

After looking through the painting at the reflected image of the painting in this way, each person inevitably lowered the mirror and stared at the building beyond—the ancient Baptistry of

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Florence—then, with obvious eagerness, raised the mirror and looked at the painting reflected in it again at least once more before reluctantly handing both mirror and painting to the next person in line. Everyone was obviously pleased and excited, especially Brunelleschi, who continually shrugged and laughed in enjoyment at the questions and comments surrounding his little experiment.

Brunelleschi wanted to demonstrate that his newly discovered rules of linear perspective could reproduce the exact "look" of things to the eye—the illusion of three-dimensional space on a two-dimensional surface. To show this, he had painted a small picture of the Baptistry on a wooden panel precisely according to his newly developed method.

After painting the building on the panel, he covered the area of the painting above the Baptistry with highly reflective silver leaf to produce a mirror-like surface. Then he drilled a hole in the painting. A person looking through the hole in the back of the painting at its reflection in the mirror held in front of it could then see more than the precisely painted image of the Baptistry: reflected in the silver-leaf surface surrounding it would be the sky and the moving clouds.

The scene seemed miraculously real! And its reality could be tested: by lowering the mirror while still looking through the hole in the painting, one could see the Baptistry itself— from exactly the same angle that Brunelleschi had drawn and painted it. The real Baptistry looked exactly the same as the painted Baptistry. The moving clouds were a dramatic touch of genius. A miracle, indeed, but a "miracle" of particular importance, because it fused art and science in a common achievement: an image that approximated how the world appears to the human eye.

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Art historian Elton Davies called Brunelleschi's painting of the Florence Baptistry a "milestone" in cultural history and compared it "to the Wright Brothers' first flying machine."[2] Psychologically, the little painting did create a change as revolutionary as flight. It began the process of turning attention from God and eternity as the basic reality in art and life to the individual self and human perception as the basic reality. Davies summarizes this impact in the following terms:

"Medieval art…had its center in the images of God, the saints, and the devil… These were fixed, changeless beings to be viewed by spectators who were moving about. But for Brunelleschi's painting (the first known use of perspective) the human spectator was the motionless center, and so was the spot on the earth's surface where he sat."[3]

Viewers of Brunelleschi's linear perspective painting were convinced that the drawing was a real duplication of the building because the linear perspective formulation created the more "real" images anybody had ever seen. They were completely convinced of the realism.

It is hard for us to imagine today what an impact seeing the first perspective images must have had. Human perception is a fluid, changing experience. Few of us today would mistake the painting of a building for the real thing.

To better understand how things can look quite different to different audiences, try viewing a horror film from the 1950s like the original *Invasion of the Body Snatchers* (1956, US, Don Siegel). It may be hard to believe the special effects that look corny today actually frightened audiences of the past—but they certainly did! As technology advances in Western culture, more and more "real" images are made possible. Audience expectations and responses evolve with the advances.

The Perspective Age Begins: The World Conforms to the Human Eye
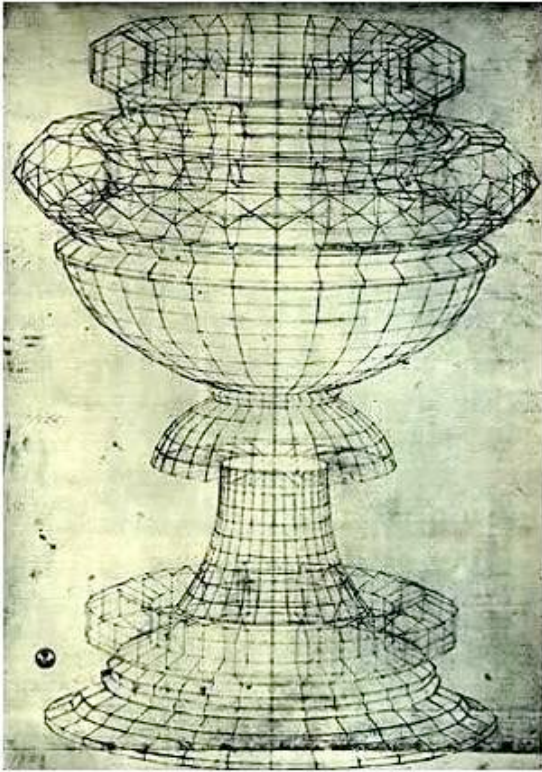
3.2 Uccello, perspective of a chalice.

We can look at two images from the history of art to understand the impact of Brunelleschi's discovery on Western art and culture.

The first image, completed within ten years of the introduction of perspective, is a drawing by **Paolo Uccello** (1397-1475), a Florentine artist who was a friend of Brunelleschi. Uccello's drawing shows how perspective could picture manmade and natural forms with a proportional and measurable sense of objectivity (**3.2**).

The second image was made some four hundred years later. It shows an anonymous couple proudly holding a photograph of their friends or relatives in their hands as they pose for a photograph of themselves (**3.3**). The photographic process that was first patented in 1839 grew directly out of artistic and scientific applications of perspective images begun in the early Renaissance. Photography is the mechanization of perspective.

3.3 Anon., "Couple holding Photo," 1850.

No one foresaw the artistic and cultural changes symbolized by these images. Between 1425 and 1839, perspective replaced the cosmic geometry of the Parthenon and the sacred geometry of Chartres with an art whose basic realism was justified by human perception itself.

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Perspective's Essential Ingredient: The Vanishing Point

Linear perspective as developed by Brunelleschi is the scientific, mathematical

formulation for creating the illusion of three dimensional spatial recession on a two dimensional

surface. Linear perspective involves the use of receding parallels that appear to converge on a

point on the horizon known as the vanishing point. The key component of Brunelleschi's

formulation is the vanishing point (**3.4**).

3.4 A Brunelleschi example of vanishing point.

The impact of perspective on perception as well as art can understood by reviewing how

artists who didn't know or use perspective depicted space and volume. **Jan van Eyck's** *Man in a*

Red Turban (usually believed to be a self-portrait, **3.5**) was created in Flanders in 1433, before

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3.5 Jan van Eyck, *Man in a Red Turban*, **1433.**

the news of Brunelleschi's discovery had made it to Northern Europe. The face in van Eyck's portrait is astonishingly realistic because the artist used several techniques to give the illusion of three dimensions on the two-dimensional surface of his painting. He used light-dark contrasts to indicate the roundness of the face. Posing the figure in a three-quarters view, he made the nose overlap the right cheek and thus appear in front of it. Since van Eyck understood that things appear smaller at a distance, he made the right eye, which is slightly farther away than the left, look slightly smaller. Since he also understood that we see texture less clearly at a distance, he accented the wrinkle lines around the closer eye and diminished them around the farther eye. Some of these techniques are quite subtle, but van Eyck's mastery of such subtleties is precisely what makes his portrait appear so convincingly real.

Most artists don't use linear perspective on faces, however. To understand how van Eyck's use of space differed form Brunelleschi's or Uccello's, we can look at his double portrait usually known as *The Arnolfini Wedding* or *Giovani Arnolfini and His Bride* (1434, **3.6**). The bride and groom stand in a domestic interior that is laden with Christian symbols including, for example, the dog that symbolizes fidelity. Diagrams of the interior reveal that in spite of van

3.6 Jan van Eyck, *The Arnolfini Wedding*, 1434.

Eyck's considerable skills at pictorially reproducing the surfaces of faces and fabrics, he did not understand perspective (**3.7**). The parallel lines of the floor, window, bed, and ceiling do not "line up" and appear to converge at a vanishing point. They do not constitute a consistent or integrated spatial configuration. As a result, van Eyck's interior appears awkward and archaic to the modern eye.

Before Brunelleschi codified the system of linear perspective, artists lacked the tools for making convincingly realistic space. The vanishing point concept enabled the artist to begin to grasp, measure, and control the experience of sight itself and then pass on that experience to others.

3.7 Skewed perspective?

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Perspective's Objectivity: Scale-Model Images of the World

Objectivity is one of the main new features of the perspective image. An objective image is an image that is in some significant and verifiable way exactly like the reality it imitates. Brunelleschi's painting was objective because everyone who saw it agreed that it looked exactly like the Baptistry that was really there.

Objectivity added a new quality of detail to artistic images. It also produced a revolution in science. Since perspective could stop and isolate forms before the human eye, they could be measured and observed at leisure, like objects. Such objective images detached from the real world by perspective could then eventually be changed and/or controlled. This potential in the objectivity of the perspective image was evident in Uccello's drawing of a *mazzaccio* (a man's hat, **3.8**).
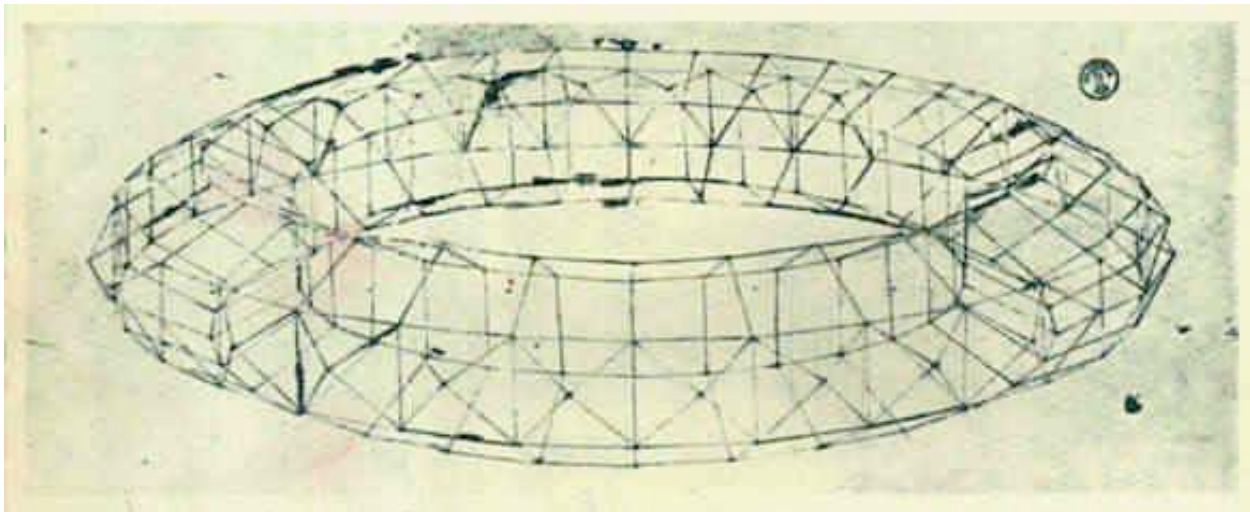
3.8 Uccello, perspective drawing of a mazzaccio.

Paolo Uccello: Madman for Perspective

Even in a city already renowned for individualistic artistic temperaments, Uccello was a designated eccentric. The Renaissance biographer Giorgio Vasari relates in his *Lives of the Artists*(1550) how Uccello's wife "told people that Paolo used to stay up all night in his study,

trying to work out the vanishing points of his perspective, and that when she called him to come to bed he would say, 'Oh, what a lovely thing this perspective is!'"[4]

Uccello's drawing shows his early mastery of the perspective technique. The story confirms all the implications in his art that he was passionately devoted to mapping the new world promised by perspective's objectivity. Uccello used a series of drawings—like the frames of a movie—to show the *mazzaccio* from different angles, so that it appeared to rotate in space. Uccello's friends were impressed by these drawings, but also amused. What good were they?

Today these drawings are no longer merely amusing; we know how useful such drawings are. They look amazingly like the computer images now used to examine visual models of objects, from molecules to planets. Today's computer-generated images are part of the still unfolding possibilities of the perspective image as it will be applied to science, art, and other fields. The resemblance between Uccello's drawings and computer-generated images is no coincidence. They are both scale images based on perspective. These image-models can be made so exact that they can be manipulated by the computer to show the effects of alterations applied to them. When it does this, the computer is fulfilling the potentiality already contained in Uccello's early fifteenth-century drawings: the use of perspective to create images that are scale models of reality.

Though Uccello's drawings demonstrate the scientific potential of perspective images, the main artistic use of perspective was to provide a convincing spatial environment for the human figure. Perspective enabled Renaissance artists to create a seemingly perfectly ordered space in which the human figure could perform heroic actions, secular or religious, with a new realism and vividness.

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Leon Battistia Alberti published the first written account of perspective within a decade of Brunelleschi's **experimental** painting of the Baptistry. Alberti, an architect and artist who knew both Brunelleschi and Uccello, described the appeal of perspective quite simply. He described perspective as a window—a window primarily for viewing the human figure: "First of all, on the surface on which I am going to paint, I draw a rectangle of whatever size I want, which I regard as an open window through which the subject to be painted is seen; and I decide how large I wish the human figures in the painting to be."[5]

The Historical Period of the Renaissance

Alberti's window into an ideal world delineated by perspective was an important artistic paradigm for the Renaissance. The historical period that followed the Middle Ages, the Renaissance was the time when the art and philosophy of ancient Greece and Rome, already used in medieval educational system, were widely embraced in an attitude sometimes called Neoplatonic (the new Platonic way).

During the Renaissance, European culture crystallized around a celebration of the values of individualism, realism and love of technology. As we shall see, these values led to heightened idealization in representations of the human form, brought about scientific experiments that expanded the projective technologies anticipated by Aristotle and Bacon, and generated mass media through the multiplication of image and text in printmaking and printed books. Brunelleschi's invention of perspective was pivotal in generating many of the technological and ideological developments of the Renaissance.

One of the enduring icons of the period, **Leonardo da Vinci's** *The Last Supper*, was composed as an ideal perspective space (**3.9**).
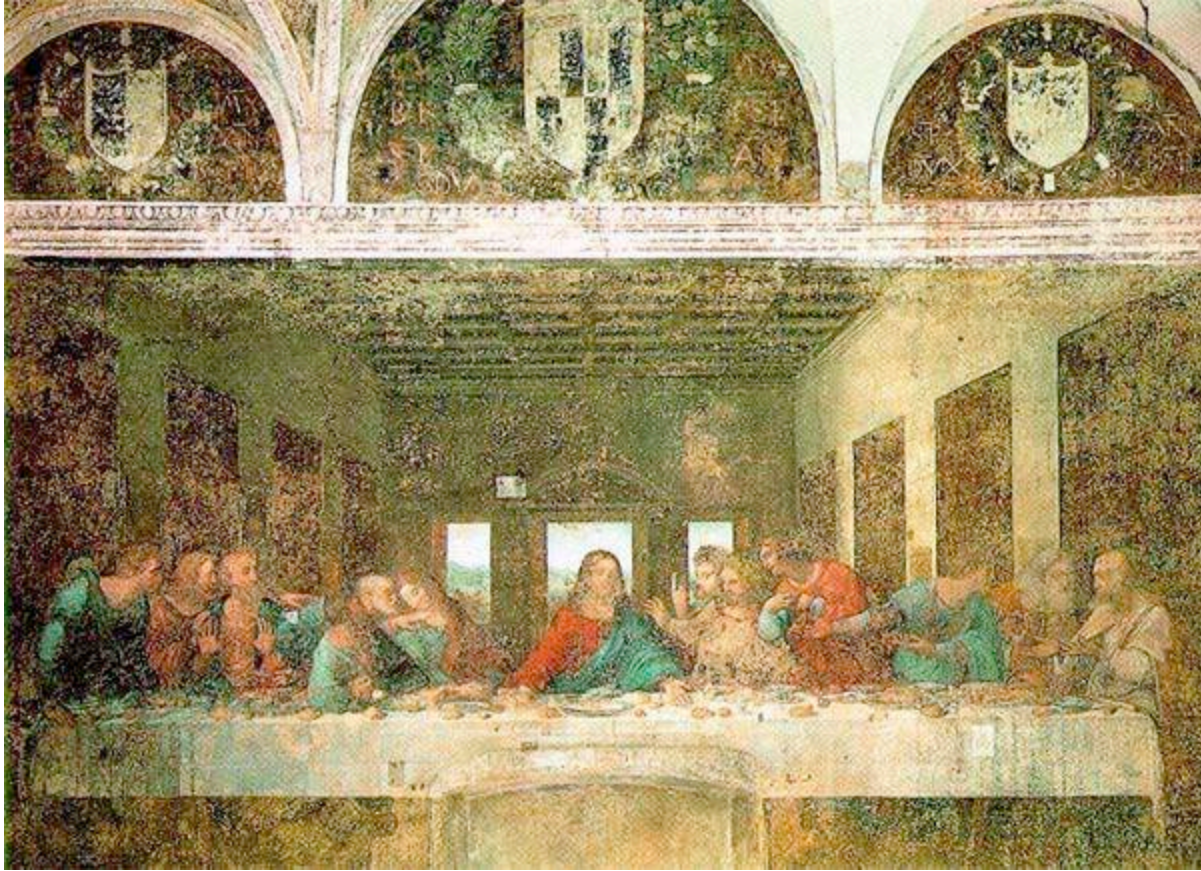
3.9 Leonardo da Vinci, *The Last Supper***, 1495-97/98. Milan.**

Leonardo da Vinci: Perspective Genius

Leonardo was born in Italy in 1452 and died in France in 1519 (**3.10**). Vasari wrote that

3.10 Leonardo, self-portrait drawing.

Leonardo was "an artist of outstanding physical beauty who displayed infinite grace in everything he did and who cultivated his genius so brilliantly that all problems he studied he solved with ease…his name became so famous that not only was he esteemed during his lifetime but his reputation endured and became even greater

after his death."[6] Although Vasari never knew Leonardo personally—he was only eight years old when the painter died far from his home in Tuscany—the superlative evaluation of the man and his work has persisted, establishing Leonardo as the outstanding genius of his age. In Vasari's time, as today, Leonardo was considered master of not only painting and the concomitant sciences of perspective and anatomy, but also of mathematics, engineering, and physics.

Leonardo's *The Last Supper*

Leonardo's skill in using perspective as a means to frame the human figure is brilliantly displayed in his mural masterpiece *The Last Supper* (1495-98). Though damaged by the artist's ill-fated experiments with the medium and damaged further by dampness and the accidents of war, the fresco still retains a unique power.

Leonardo's use of perspective in *The Last Supper* was part of his ongoing investigation of the relationship between art and mathematics. As Kenneth Clark notes, "Painting is the science by which visible objects are recreated in permanent shape. And since the exact sciences must be stated in mathematical terms, Leonardo insists that the student of painting must be grounded in mathematics. This union of art and mathematics is the basis of perspective."[7]

Leonardo used the most stable geometric form to underscore Jesus' liturgical stability: Jesus is configured as an equilateral triangle. By locating the vanishing point behind the head of Christ, Leonardo ingeniously framed the entire space of the scene on the central figure of Christ (**3.11**). Despite the agitated movements of the apostles—Christ has just announced that one of them would betray

3.11 Leonardo, detail of "Christ" from *The Last Supper***.**

him—the symmetry of the architectural space surrounds Christ like a halo of order and calm. Christ is the controlling center, literally and psychologically, of the entire scene.

Leonardo further unified his composition through his use of light. Although there are three windows in the back of the room, none of the disciples is lit from behind. Instead, they are all illuminated by an unseen light source in the upper left of the mural. The viewer's eye is drawn along the downwards diagonal established by the light, from upper left towards the lower right, and "captured" by the central iconic image of Christ.

Leonardo took his use of perspective and light even further in order to have a powerful psychological effect on the viewer. *The Last Supper* is located in the refectory or dining hall of a monastery, and Leonardo painted the life-size scene so that the monks at their meals would appear to be in the same space as the table of Christ and the apostles.

The Last Supper as an "Up-Date"

The psychological appeal of *The Last Supper* was enhanced by the fact that Leonardo brought the historic event into contemporary context and altered it to reflect the upper class standing of its intended audience. Although the actual Last Supper took place in the attic of a Jerusalem inn during the first century A.D., Leonardo situated his inside an Italian Renaissance palace. The artist also transformed Jesus and the disciples—thirteen relatively impoverished men—into wealthy actors on the stage of history. Although Jesus and the disciples were members of the working class who probably took their modest meals while sitting on the floor, Leonardo shows them at an immense table covered with a linen cloth and set with silver plates. As the son of a carpenter, Jesus probably never wore clothes made of dyed fabrics (which were more costly than plain textiles). Leonardo shows Jesus in bright red and blue, in spite of the fact

that red and blue dyes were expensive luxury items. Of course, the bright red and blue also draw the viewer's eye directly to Jesus.

All of Leonardo's considerable skills evidenced in creating *The Last Supper* serve to make it one of the central icons of Christendom. It has been copied, quoted and parodied for centuries. Visitors to Milan can buy everything from T-shirts to ashtrays with images of *The Last Supper* on them. Spanish Surrealist Luis Bunuel quoted the image in one of his most celebrated and controversial films (*Viridiana*, 1961). American Pop artist Andy Warhol's homage to *The Last Supper* was a large painting of a paint-by-number rendition of the original masterpiece. The actors in the "Northern Exposure" television series were arranged to simulate *The Last Supper* in one of the episodes. And, as we shall see, Judy Chicago's 1979 *Dinner Party* began as a female version of Leonardo's original.

Leonardo's *Mona Lisa*: Portrait as Celebrity

Leonardo da Vinci's most famous painting—some say the most famous painting in world—is his portrait known to English speakers as the *Mona Lisa* (**3.12**). The painting portrays
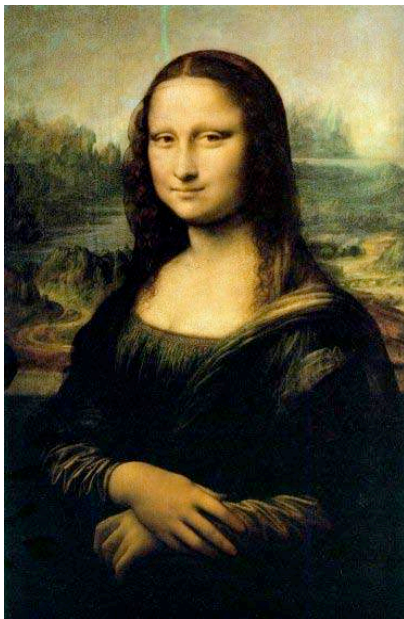

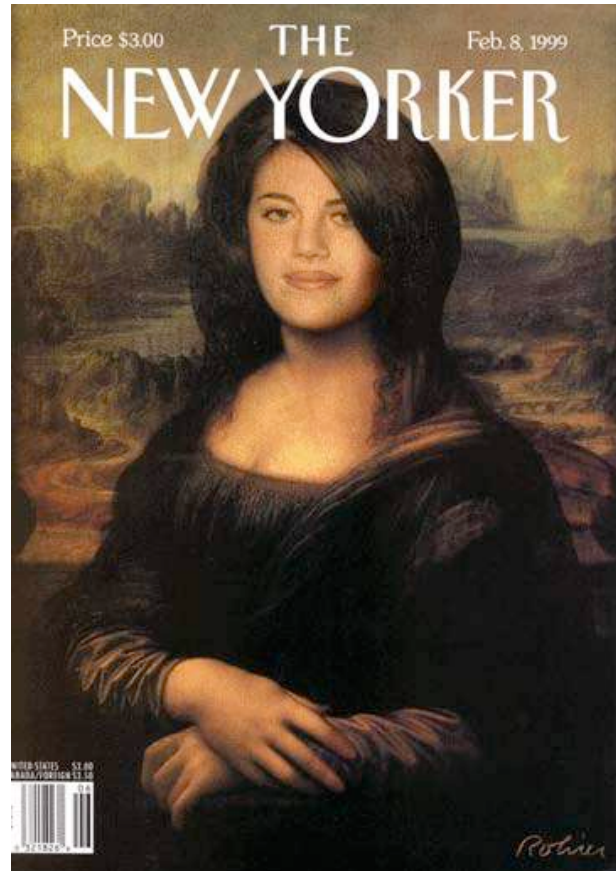**3.12 Leonardo, *Mona Lisa*, 1501-04.**

a fashionable young Italian woman seated on a balcony with a shadowy landscape behind her. She is shown in three-quarters view and wears a mysterious smile.

The *Mona Lisa* allure has captivated people since its creation. Ever since Leonardo's time, artists have copied, quoted and parodied the image. Advertisers have used it extensively to sell products they want to promote as "masterpieces." The painting has been the subject of

numerous books, including the run-away bestseller of 2003-04, *The Da Vinci Code* by Dan

Brown (**3.13**). In February 1999, during the Clinton sex scandal, *New Yorker* magazine put an

image of Monica Lewinsky as Mona Lisa on its cover (**3.14**). And when pop singer Janet

Jackson had a "costume malfunction" during her halftime performance at Superbowl 2003, a

satiric video of "Mona Jackson" sped throughout the Internet.
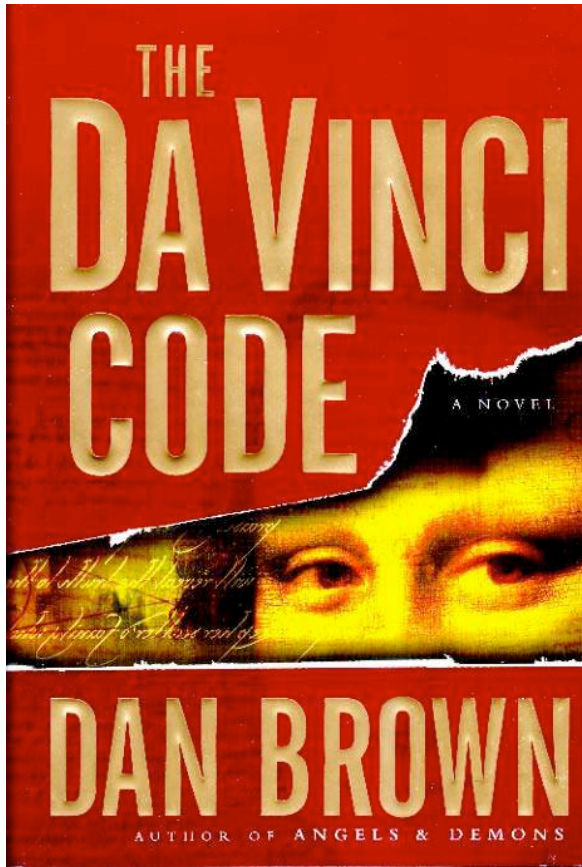
**3.13 Dan Brown,** *The Da Vinci Code.*   **3.14 The cover of** *The New Yorker.*

British historian Donald Sassoon has analyzed how the *Mona Lisa* became what he calls

"a universal icon." Sassoon writes that, like most historians, he starts "with the assumption that

the renown of masterpieces rests on a complex, historically determined sequence of events [and]

the participation of various historical agencies (people, institutions, processes) working in a

largely unplanned or unconscious manner for different ends."[8] He asserts that a large component

of *Mona Lisa's* appeal rests on its relationship to Leonardo, whose art and life have been

heroically mythologized to construct him as the reigning creative genius of Western culture.

Sassoon observes that da Vinci's painting is a "polysemic" or open work, meaning that it

is open to a plurality of meanings and allows the viewer/interpreter to determine its significance.

The "openness" of the painting begins with debates about the identity of the woman painted:

while most scholars believe that she is Lisa Gherardini, not all agree. If she is Lisa Gherardini,

she was married to Florentine merchant Francesco de Bartolomeo di Zanobi del Giocondo. (The

painting is called *La Gioconda* in Italian and *La Joconde* in French.) But confirming her identity

would not "close" the meaning of the work. If Leonardo simply painted the portrait of a middle

class woman in Florence, why did he not deliver the painting to Lisa or to her husband? Why did

the painter carry the *Mona Lisa* with him when he traveled to France to work for Francois I?

Leonardo's relationship with the King of France attained mythic proportions. In the early

nineteenth century, French academic artist **J.A.D. Ingres** created a masterwork of historical re-

imagining when he painted the Renaissance master dying in the arms of Francois I (**3.15**).

Sassoon compares paintings like Ingres' *The Death of Leonardo in the Arms of King Francois I*

(1818) to modern biographical films: "…they blended history and fiction to produce a more

exciting narrative. The artist would fill the picture with the images and works of those who had

been important in the life of the central character."[9]
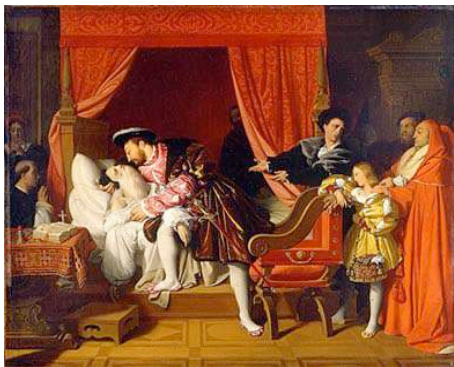
3.15 J.A.D. Ingres, *The Death of Leonardo in the Arms of King Francois I***, 1818.**

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The French king reportedly kept the *Mona Lisa* in his bedroom. After his death, it stayed at the palace in Versailles until it was moved, during the French Revolution, to the Paris palace that was transformed into the Louvre Museum. Middle class Parisians flocked to the Louvre, curious to see the paintings aristocrats like Francois I and his successors had surrounded themselves with. Then, from 1800-1804, Napoleon kept the painting in *his* bedroom. The *Mona Lisa* returned to the Louvre for the rest of the nineteenth century, during which time it became an icon in the romantic cult of the *femme fatale*, that is, the exotic woman whose attraction is dangerous, often deadly, to her male victims.

Sassoon notes that the fame of the painting was greatly enhanced by nineteenth century poets and critics like Theopile Gautier, who turned *Mona Lisa* into the archetype of the mysterious ideal woman to be worshipped on a pedestal (as opposed to real women whom Gautier often treated with disdain.) In 1855, Gautier called *La Joconde* a "sphinx of beauty."[10] A few years later, poet Walter Pater famously compared her to Leda, Helen of Troy, Saint Anne…and to a vampire. Gautier and Pater's diverse comparisons confirm that the painting is indeed "polysemic" in nature.

In 1910, Sigmund Freud psychoanalyzed Leonardo da Vinci, basing his essay on earlier writings like Pater's. Freud interpreted *Mona Lisa's* smile—the smile that "exercised no less powerful a fascination on the artist than on all who have looked at it for the last four hundred years"--as an evocation of Leonardo's mother's smile. According to Sassoon, the fact that Leonardo painted similar smiles on many of his female subjects confirmed "the now commonly held view that men seek in the women they love the mother they have lost to their father."[11] (The competition between father and son for the mother's love is part of Freud's Oedipus complex, discussed further in Chapter 8.)

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The *Mona Lisa* made the transition from *femme fatale* to kitsch icon in mass media of the twentieth century. One incident that propelled the painting into media celebrity happened on August 21, 1911, when an Italian painter working at the Louvre Museum stole the *Mona Lisa*. Journalists, critics, and commoners bemoaned the loss. Something more or less taken for granted became infinitely desirable in its absence. As the population of France mourned, the painting skyrocketed in popularity. Thankfully, it was soon returned to the Louvre, where it reigns as the most sought-after tourist destination in art. It was precisely this cult status that prompted notorious iconoclast artist **Marcel Duchamp** to use a reproduction of the *Mona Lisa* in his 1919 parody of the whole notion of the unique artistic masterpiece (**3.16**).

3.16 Marcel Duchamp, *L.H.O.O.Q.*, 1919.

Since the time of the theft, the painting has been used to advertise everything from videotapes to lasagna. Sassoon illustrates one of the first commercial uses of the image: the 1915 label for Gioconda Acqua Purgative Italiana, a water product used as a laxative and as protection against malaria. Advertising writer Barry Hoffman reproduces more than a dozen recent uses of the painting, which he calls "The Queen of All Media," in ads for commodities like McDonald's and milk, film, guns, and Fiat cars (**3.17**). (The use of the *Mona Lisa* in advertising is discussed further in Chapter 9.)

3.17 An advertisement for Gateway computers.

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The *Mona Lisa* & Other Renaissance Portraits

Leonardo's famous portrait can be compared with other images of women from the Renaissance. Through much of the fifteenth century, portraits of Italian women were often done in profile. Such women became passive objects to be viewed by what art historian Patricia Simons calls "the triumphant potency" of the male gaze.[12] A good example of the profile female portrait is *Giovanna Tornabuoni* (1488, **3.18**) by one of Michelangelo's teachers, **Domenico del Ghirlandaio** (1449-1494). Seated beside a shelf or niche containing a book and some jewels, the young woman gazes contentedly towards an unseen vista. Her elegantly curled hair is treated with the same precision as the tucks and folds of her richly brocaded dress. Both the objects and the woman are presented as visual "prizes" to be possessed by the presumed male owner/viewer.

3.18 Domenico del Ghirlandaio,
   ***Giovanna Tornabuoni*, 1488.**

3.19 Leonardo, *Isabella d'Este*.

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Leonardo occasionally used the profile pose, as in his portrait of **Isabella** d'Este (**3.19**). But most of his female portraits are, like the *Mona Lisa*, in three-quarters view. Positioned so that their heads turn towards the viewer, the women in Leonardo's portraits meet the viewer's gaze with calm self-confidence. Art historian Mary D. Garrard suggests that Leonardo's empathy with women, as evidenced in such paintings, was socially unusual but not psychologically **aberrant** as Freud had argued. Instead, asserts Garrard, "Leonardo presented through art a view of the female sex that was culturally abnormal in the patriarchy of his day: woman understood individually as an intelligent being, biologically as an equal half of the human species, and philosophically as the ascendant principle in the cosmos." Further, he did so "in a period when women were neither politically nor socially empowered to make such a case for themselves."[13]

The fact that Renaissance women were socially disempowered makes the accomplishments of female artists like **Sofonisba Anguissola** even more remarkable. Anguissola also created important portraits of Renaissance women.

Sofonisba Anguissola: Portraits of Figures in Conversation

Sofonisba Anguissola (1532/35-1625) was widely famed as a portrait painter. She benefited from the expanded educational possibilities for women of her social standing and learned to read classical literature, write poetry, dance, and play musical instruments, as well as draw and paint. Her father supported her pursuit of art. In 1557, he wrote Michelangelo to request a drawing she could copy and learn from. When Michelangelo complied, her father thanked him by sending the master artist his daughter's drawing *Boy Pinched by a Crawfish*. Michelangelo passed the drawing on to an important collector, Cosimo de Medici, in whose home it was copied by several later artists, including possibly Caravaggio (whose work is discussed in the next chapter.)

Anguissola was the first woman artist to become an international celebrity. She was invited to work in Philip II's court in Madrid, later married an Italian nobleman and finally settled in Genoa. Noted Dutch painter Anthony Van Dyck interviewed her there in 1624.

In addition to numerous self-portraits and depictions of the aristocrats she served, Anguissola helped create what is called the "portrait conversation piece"[14] (**3.20**). Her 1555 portrayal of her sisters playing chess is an unusual composition of three girls caught in the midst of a game. Vasari wrote that this painting was "most carefully finished, representing her three sisters playing at chess, in the company of an old lady of the house, making them appear alive and lacking speech only." [15]

3.20 Sofonisba Anguissola, *The Chess Game*, **1555.**

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Anguissola's sisters playfully interact with each other. In contrast, Leonardo's *Mona Lisa* is a single figure in a static pose. While the **Anguissola's** invite viewers into amiable relationship, *Mona Lisa* quietly returns the viewer's gaze.

Leonardo's Notebooks: Images of Innocence, Wonder & Power

Leonardo was more than a great artist. He was a great scientist and engineer of legendary abilities. He was also a prophet of the modern, technological world we now inhabit. Uccello was fascinated by the transformation of a *mazzaccio* into a perspective image. Leonardo envisioned the transformation of the world itself—a transformation largely made possible, in science and technology as well as in art, by the power of the perspective image.

Along with several masterpieces of painting and his legend itself, Leonardo left over two thousand pages of notebook drawings and scribbled ideas that few people saw during his lifetime. It is the notebooks that suggest the full scope of his vision and ambition.

In some of his anatomical drawings, da Vinci presented each organ and limb independent of the others. In doing so, he invented the "exploded drawing," which shows each part separated out slightly from its neighbor. This kind of drawing is familiar today to anyone who has tried to assemble a child's bicycle or a carburetor from a kit. Leonardo wanted to show how the "machine" of the body fit together (**3.21**).

These drawings of the body also show the drawbacks of the perspective image, however. Objectivity requires the observer, at least temporarily, to regard the body as a machine or a mere object in three-dimensional space, an attitude that was unimaginable in Greek or medieval culture.
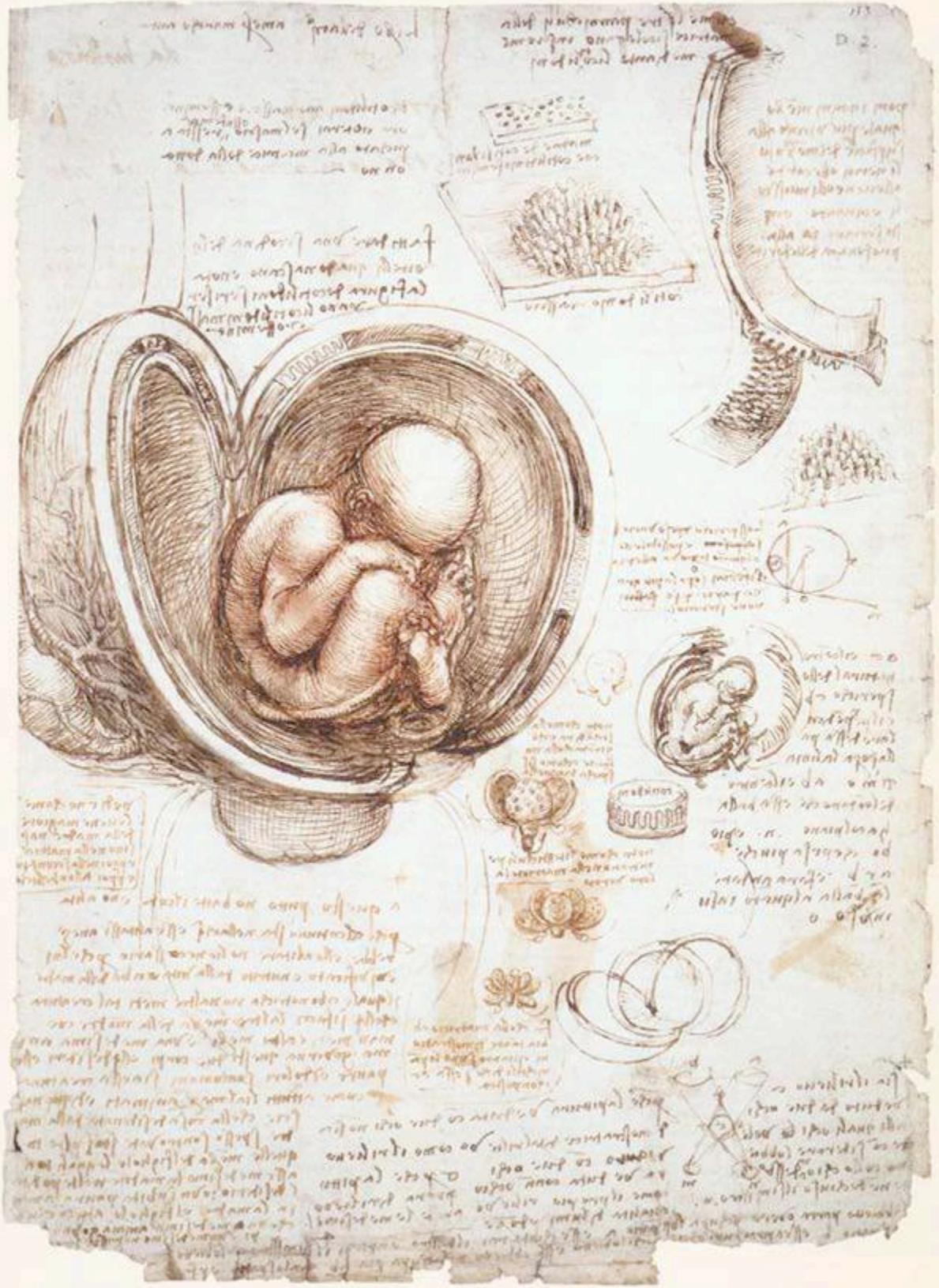
3.21 Leonardo, from his anatomical sketches.

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Leonardo & Technology: From Nature to Artifice

Leonardo wanted more than a better understanding of nature; he wanted to change nature. The exultant Leonardo wrote not only that he wanted to "know the secrets of things," but also "I want to control rivers."[16] His technological drawings show how this can be done—through the linking of power with knowledge made possible by the perspective image.

He imagined machines in astonishing variety: an automated filemaker, an "auto-mobile," winged machines for flight. The power-multiplying devices emerged in a relentless stream of prophetically creative drawings. He saw nature opened up, examined, and then—true to the growing impulses of the age—improved upon (**3.22**).
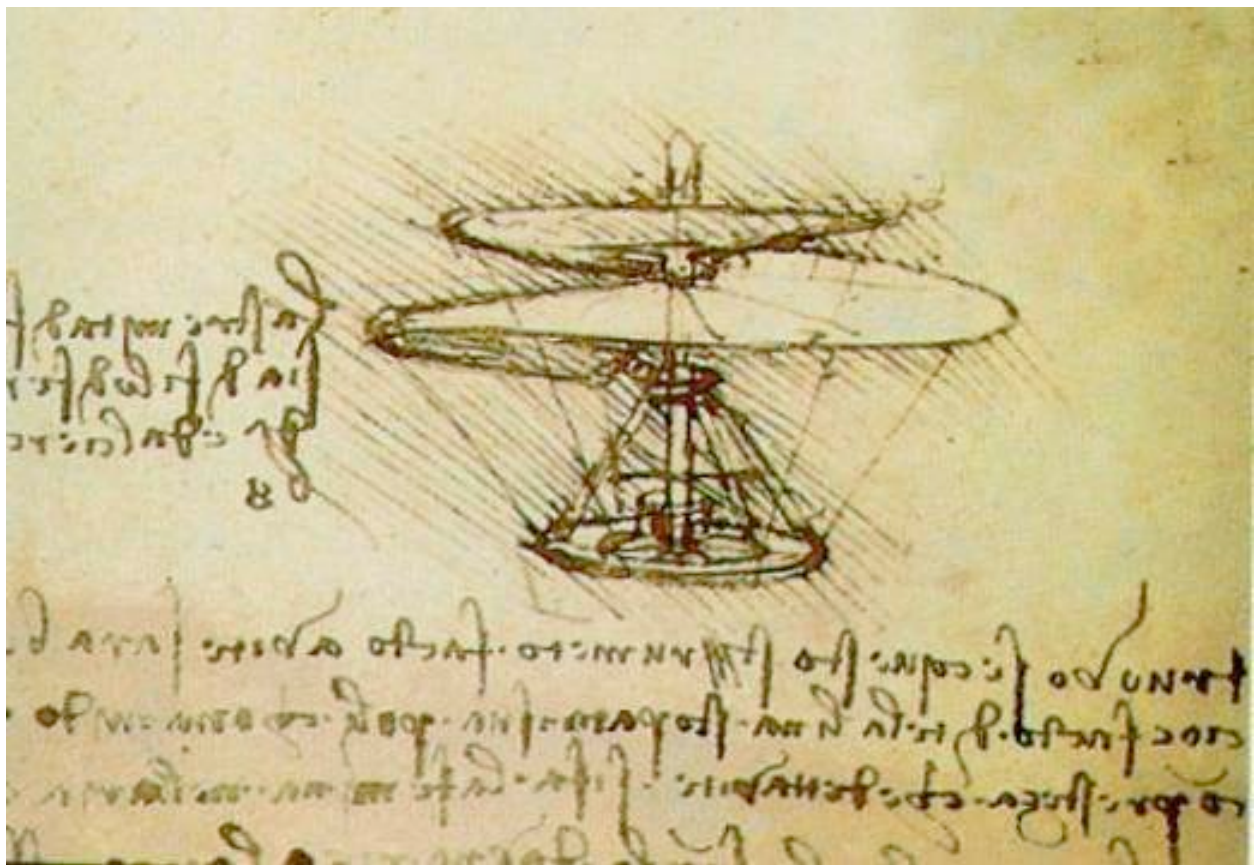
3.22 Leonardo, "Aerial Screw."

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Leonardo's notebooks, even more than his painted masterpieces like *Mona Lisa* or *The Last Supper*, show what might be called the "perspective mentality," that is, a way of thinking about reality based on the new viewpoint embodied in perspective. He wrote, "The eye, which is called the window of the soul, is the chief means whereby the understanding may most fully and abundantly appreciate the infinite works of nature…[because] the painter employs the exact images of these forms in order to reproduce them."[17]

As John Berger notes, "The convention of perspective, which is unique to European art and which was first established in the early Renaissance, centres everything on the eye of the beholder…Perspective makes the single eye the centre of the visible world. Everything converges to the eye as to the vanishing point of infinity. The visible world is arranged for the spectator as the universe was once thought to be arranged for God."[18]
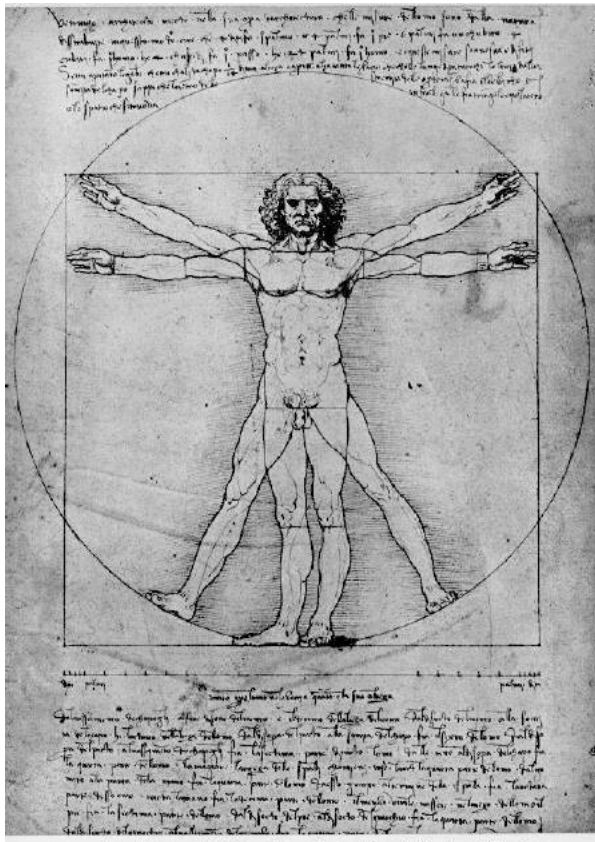
From this time on, the perspective-trained Western eye will increasingly regard nature as a kind of collection of detachable and movable parts to be rearranged on the chessboard of human purpose. The perspective image, by its very objectivity, encourages this attitude. In Leonardo's notebooks, nature is already beginning to drift out of the geometry of the sacred into the pragmatic geometry of industrial design.

Leonardo's notebooks provide some of the clearest evidence that our current technological society would be impossible to imagine without two powerful effects of the perspective image: first, its practical role as a kind of lever that moves forms away from their natural background toward the objectivity necessary for technological transformation; and, second, its psychological effect of encouraging the sense of detachment or distance necessary for a person to effectively intervene in natural processes.

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Leonardo & Ideal Anatomy

Kenneth Clark discusses the connection between geometry and anatomy and in Leonardo da Vinci's art. "With proportion it [anatomy] lay at the root of Renaissance aesthetics, for if man was the measure of all things, physically perfect man was surely the measure of all beauty, and his proportions must in some way be reducible to mathematical terms and correspond with those abstract perfections, the square, the circle and the golden section."[19]

Leonardo combined his interest in geometry with scientific investigation of the human form (**3.23**). He attended dissections at the hospital of Santa Maria Nuova in Florence. He met and worked with anatomist March Antionio della Torre. In 1512, he did the first drawing of a child in the womb. And a contemporary account says that Leonardo, "with great diligence," wrote "an admirable book on the depiction and movements of men (de pictura et movimenti humani)."[20] The book itself is lost, but several of Leonardo's drawings of the human form survive. The best known of these drawings is the *Vitruvian Man*, named after the ancient author of a (now lost) treatise on ideal human proportion.

3.23 Leonardo, "The Vitruvian Man."

Leonardo's combines his interest in geometry and his interest in anatomy in a depiction of an idealized male body arranged inside intersecting geometric solids.

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Italian Renaissance Bodies: The Humanist Ideal

During the Renaissance, the realism in the figures on the North door of Chartres Cathedral combined with an idealization inspired by Greek and Roman prototypes and the scientific advances of Leonardo and his colleagues to produce an explosion of human images.

Discoveries and excavations led to direct confrontation with ancient Greek and Roman originals. The *Apollo Belevedere* was excavated in 1479 (**3.24**).[21] Soon, there was throughout Italy a "mania" for collecting and displaying antique statues. Pope Julius II (born 1443, elected 1503, died 1513) built a sculpture garden in the Vatican and installed the *Apollo Belevedere* in a place of honor.[22] Artists responded by creating images that reflected Greek and Roman ideals.


3.24 Apollo Belvedere.
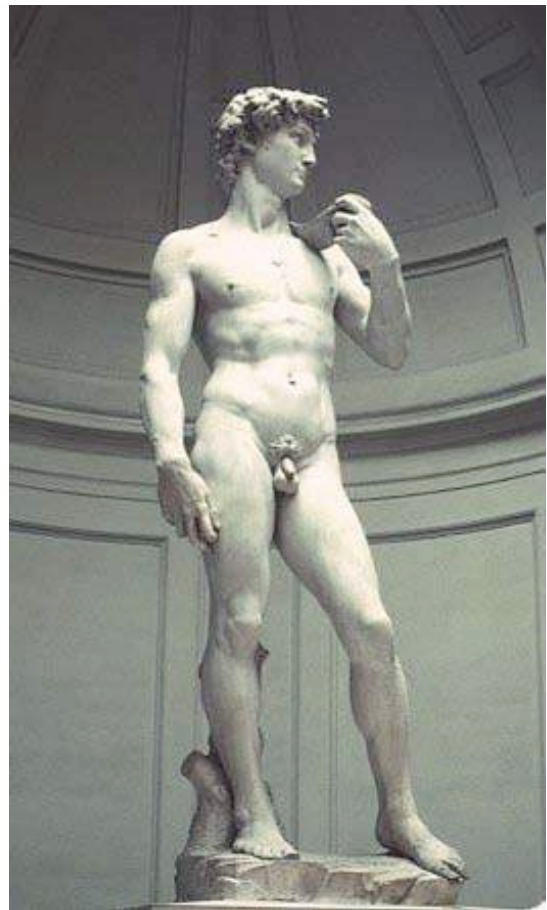
3.25 Michelangelo Buonarroti, *David*, **1501-04.**

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In 1496, young Florentine artist **Michelangelo Buonarroti** (1475-1564) traveled to Rome to draw figures like the Belevedere in order to learn antique proportions and poses. We have already discussed Michelangelo's *David* as one of the great Renaissance icons that celebrate the ideal human nude (**3.25**).

Michelangelo's *David*

3.26a Michelangelo, anatomical sketch.
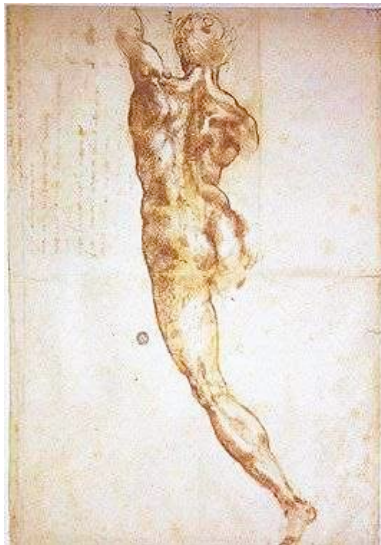
3.26b Michelangelo, anatomical sketch.

Michelangelo's early masterpiece *David* (1501-1504) reveals the artist's mastery of proportion and anatomy. Behind the statue of *David* were years of drawing the human body, including knowledge gained from the dissection of cadavers (**3.26**). *David* is a dramatic artistic realization of this knowledge. Except for the size of the hands, the figure has the classical Greek proportions rooted in accurate detail that characterizes Renaissance art. (Remember that David was originally intended for the facade of a large church in Florence; seen from below, the proportions would have appeared perfect.)

David is Michelangelo's striking embodiment of an individual capable of heroic action in the present world, reflecting the European mood of optimism only a decade after the discovery of America. The response of public and patrons was clear. In his own day, Michelangelo's creativity was given the highest possible praise. He was described by the adjective *divino*, "divine." (Not everyone joined in the

celebration of the "new" art of nudity, however: Stones were thrown at David when it was first

displayed in Florence.[23])

According to Kenneth Clark, "Michelangelo, like the Greeks, was passionately stirred by

male beauty."[24] Clark calls *David* "Michelangelo's greatest embodiment of the Apollonian

idea,"[25] but he adds that there is a visible difference between Greek originals and Michelangelo's

Renaissance portrayal: "…the head on its strained, defiant neck, the enormous hands, and the

potential movement of the pose…force him far outside the sphere of Apollo. This overgrown

boy is both more vehement and less secure. He is a hero rather than a god."[26]

Michelangelo's Sistine Chapel Ceiling Paintings

Even though he described himself as
a sculptor and stubbornly resisted the efforts
of powerful popes like Julius II to enlist his
talents as a painter, Michelangelo's fresco
paintings in the Sistine Chapel are as famous
as his sculptures (**3.27**). Attached to Saint
Peter's Cathedral in Rome, the Sistine was
the pope's private chapel, built by Julius's
uncle, Pope Sixtus IV in 1483. Pope Julius II
hired Michelangelo to paint the ceiling,
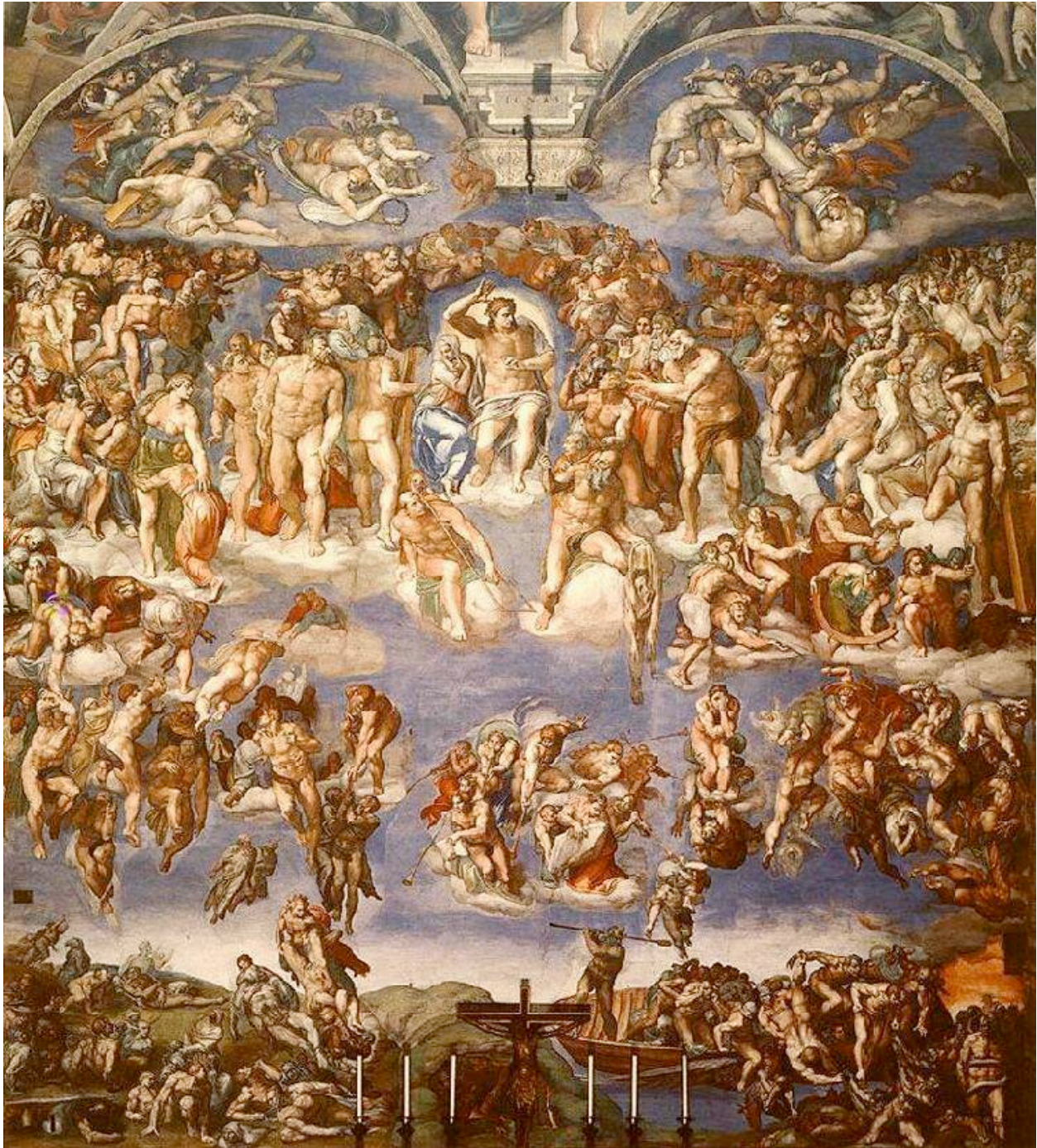which he did between 1508 and 1512

3.27 Michelangelo, "Moses,"
from the *Tomb of Julius II*.

 (**3.28**). Decades later (1536-1541), Michelangelo painted a tumultuous scene of *The Last*

Judgment on the 48' X 44' wall behind the altar (**3.29**). His patron at that time was Pope Paul III

(born 1468, elected 1534, died 1549).

3.28 Michelangelo, Sistine Ceiling, 1508-12. Vatican, Rome.

3.29 Michelangelo, *The Last Judgment***, 1536-41. Sistine Chapel, Vatican, Rome.**

Originally, the ceiling had been painted in bright blue with gold stars to simulate a night sky. Pope Julius II hired Michelangelo to re-paint it, originally proposing a pictorial scheme dominated by geometric architectural forms. Michelangelo rejected the Pope's proposal as a "poor thing"[27] and chose instead to depict the creation and fall of man as recorded in the Bible.

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He covered the more than 12,000 square feet of ceiling with over 300 figures, most of them larger-than-life. (The Adam in the *Temptation* scene discussed below measures over 10 feet tall.)

The nine central images are episodes from Genesis that are meant to be read like a narrative line: God separates the light form the dark; God creates the planets and places them in the heavens; God separates the land and the water on earth; God creates Adam; God creates Eve; Adam and Eve eat the forbidden fruit from the Tree of the Knowledge of Good and Evil, then are expelled from Paradise; Man falls into sin; God sends the floods to destroy all those not saved in Noah's Arc; Noah falls into sin. From the narrative follows the Christian assertion that Man is innately sinful (the belief in "original sin") and that Man needs the redemptive sacrifice of Jesus' death on the cross in order to be saved and eventually rejoin God in heaven.

[SIDEBAR: Michelangelo's paintings on the Sistine Chapel ceiling were recently quoted in the mass media. In an ironic reversal of cultural values, artist **Jeff Wong** reworked the Renaissance composition, replacing the religious figures with sports heroes for the September 27, 2004 cover of *Sports Illustrated Magazine*. See <http://sportsillustrated.cnn.com/si_online/covers/issues/2004/0927.html>]

The Sistine Chapel Ceiling is painted in fresco, a difficult medium that Vasari described as "manly."[28] True fresco involves painting on wet plaster (fresh or *fresco* plaster) so that the pigment becomes bonded with the plaster and the painting becomes part of the wall. Michelangelo began the process with preparatory drawings called "cartoons," which the Pope or his emissary had to approve. The drawings were then expanded to full scale and transferred to the plastered ceiling. Sometimes, a pointed tool was pressed over the drawn lines to create a shallow groove in the wet plaster. At other times, the lines of large versions of the drawings were pierced with a series of holes. Then the drawings were held up to the ceiling and powdered

charcoal was pressed through the holes. When the drawings were removed, the artist had a "connect-the-dots" sketch outlining his composition and could commence painting on the wet plaster.
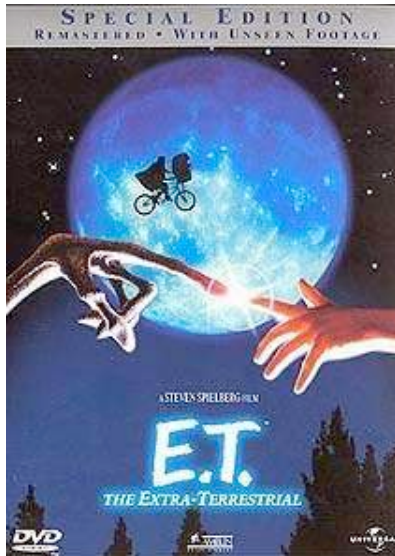
Michelangelo's *Creation of Adam*

Michelangelo's most famous panel from the Sistine Chapel Ceiling depicts the *Creation of Adam* (**3.30**). It is a powerful diagonal composition based on the parallel positions of God and Adam. If we "enter" the composition of Michelangelo's *Creation of Adam* at the upper left, and scan towards the right, our gaze meets the figure of God zooming towards us. The implied lines of the composition support Michelangelo's belief in an active, dynamic power Creator.
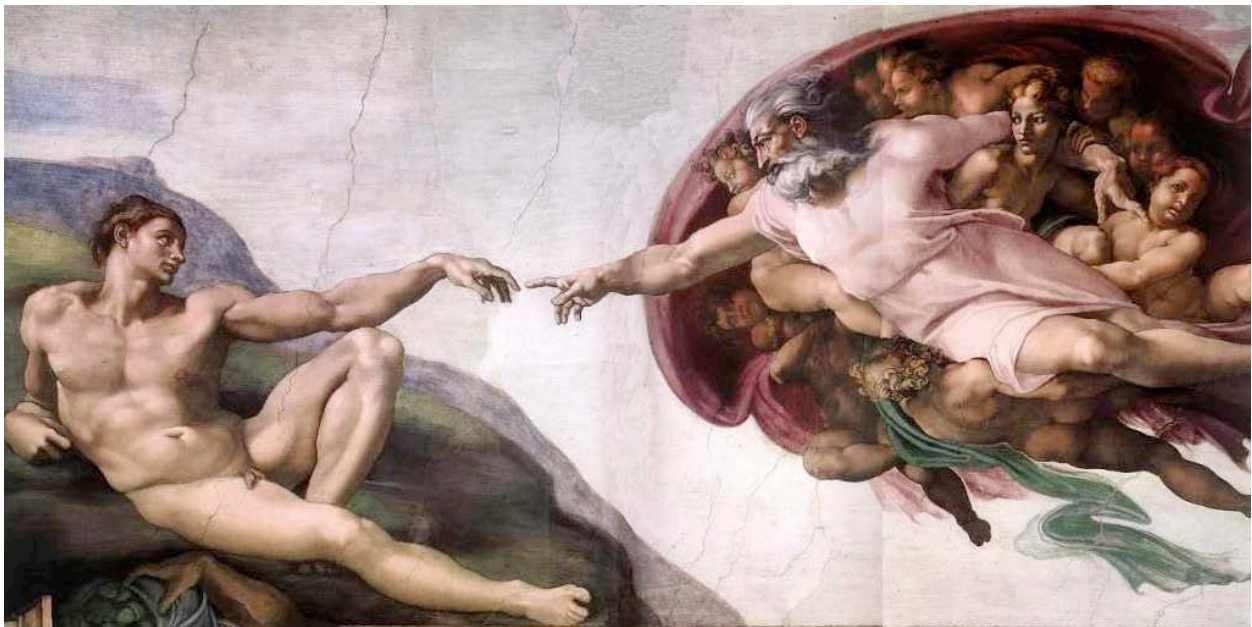
3.30 Michelangelo, "Creation of Adam," Sistine Ceiling, 1508-12. Vatican, Rome.

In the *Creation of Adam*, God is depicted as an elderly white man with a powerful muscular body. It was such an unusual depiction at the time that some commentators failed to recognize it as God.[29]

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Adam is similarly "buff." Their physiques are intentionally exaggerated. Michelangelo believed that a beautiful body was the ideal reflection of a perfect moral character. And, of course, he believed that God and His first creation embodied divine perfection.

3.31 Steven Spielberg, *E.T.*
   ***The Extra-Terrestrial*, 1982.**

Crossing the active diagonal thrust of the composition is God's outstretched arm, which reaches towards Adam to give him the divine spark of life. The position of their two hands has become such an important icon in Western Culture, that artists quoted it in the posters for Steven Spielberg's 1982 film *E.T. The Extra-Terrestrial* (**3.31**).

Michelangelo's *Temptation & Expulsion*

According to Genesis, God created Adam, and then Eve, and placed them in the Garden of Paradise known as Eden. He told them they could eat the fruit of all the trees in the garden, with the single exception of the fruit of the Tree of the Knowledge of Good and Evil. Later, Satan, a fallen angel, entered the garden and convinced Eve to try the forbidden fruit. Eve in turn convinced Adam to do so. As a result of their transgression, Adam and Eve were expelled from the garden (**3.32**).

3.32 Michelangelo, "Fall and Expulsion from Eden," Sistine Ceiling.

When Michelangelo depicted this part of the story, he included both events in one panel, like a "before and after" illustration. First, on the left, Eve hands Adam the forbidden fruit. Then, on the right, an avenging angel drives them out of paradise. In the center of the composition, placed like a pivot or axis between the two events, is the tree itself. Circling around the tree is Satan. Michelangelo portrays the evil figure -- the figure responsible for mankind's first fall into sin -- as a female serpent, complete with long blonde hair and breasts. His portrayal was not unusual: in what historian Ross King calls the "misogynistic medieval tradition," the serpent was always female.[30]

The Genesis 3:16 account of the Temptation indicates how far back in Western culture the male/female bipolar opposition can be observed. When God punishes Adam for eating the forbidden fruit, He says, "And I will put enmity between thee and the woman…" Punishing Eve, God says: "I will greatly multiply thy sorrow…thy desire shall be to thy husband and he shall rule over thee." This is the passage the church used to justify the subjugation of women.

Prior to the Renaissance, people were limited to reading such Biblical passages in rare and cumbersome manuscripts that were the prized possessions of rulers and church officials. But during the Renaissance, a revolutionary invention changed this.

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The Revolution of Printed Books

The artistic works of geniuses like Leonardo and Michelangelo give the most enduring and powerful experience of the Renaissance image of the human being. Nevertheless, a novel yet equally powerful cultural force carried the same iconic experience far beyond the audience who might see *The Last Supper* or the frescoes in the Sistine Chapel. This was the emerging Renaissance version of a mass medium: printed books with printed pictures. The printing of books from movable type dates from the same period as Brunelleschi's discovery of perspective.

Gutenberg & the Movable Type printing Press

While Brunelleschi was investigating spatial representation techniques, **Johann Gutenberg** (c. 1400-c. 1467) was experimenting with improved techniques for printing multiple copies of written texts. A German metal worker who specialized in designing and producing coins, Gutenberg was also trained in gem-polishing and the manufacture of looking glasses. Some time in the 1430s, he developed a technique for casting multiple letters of type. Paired with his improvements on the printing press and printers' ink, his casting design led to a revolution in printmaking: the beginning of the mass production of books. The oldest surviving specimens of his printing are ecclesiastical: a poem on the Last Judgment and a Church Calendar for 1448. What is now called the Gutenberg Bible was created around 1454-55. Of the 180 copies originally printed, only 48 survive. Some of these are partial. (Readers can consult the Gutenberg Bible website to see digital images of two of these: http://www.bl.uk/treasures/gutenberg/homepage.html)
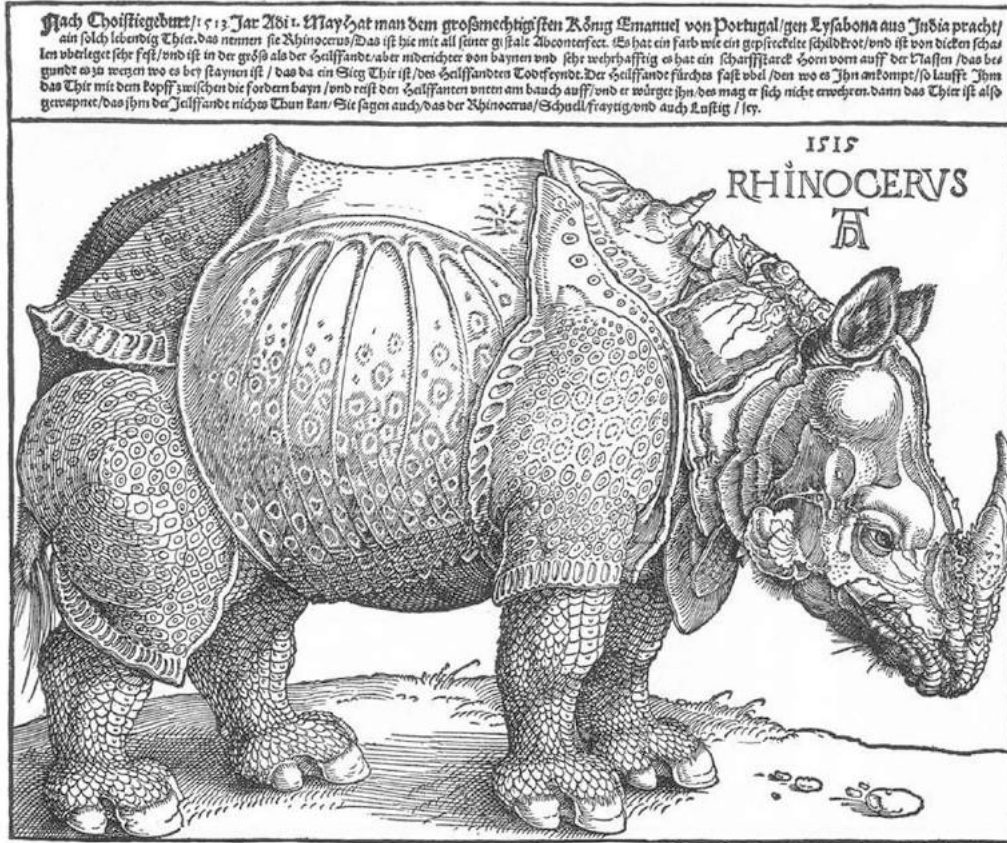
Gutenberg revolutionized the dispersal of knowledge in the Western world. What a German scholar wrote in 1910 is still true today: "The invention of Gutenberg should be classed with the greatest events in the history of the world. It caused a revolution in the development of

culture, equaled by hardly any other incident in the Christian era. Facility in disseminating the

treasure of the intellect was a necessary condition for the rapid development of the sciences in

modern times. Happening as it did just at the time when science was becoming more secularized

and its cultivation no longer resigned almost entirely to the monks, it may be said that the age

was pregnant with this invention. Thus not only is Gutenberg's art inseparable from the progress

of modern science, but it has also been an indispensable factor in the education of people at

large. Culture and knowledge, until then considered aristocratic privileges peculiar to certain

classes, were popularized by [Gutenberg's] typography…"[31]
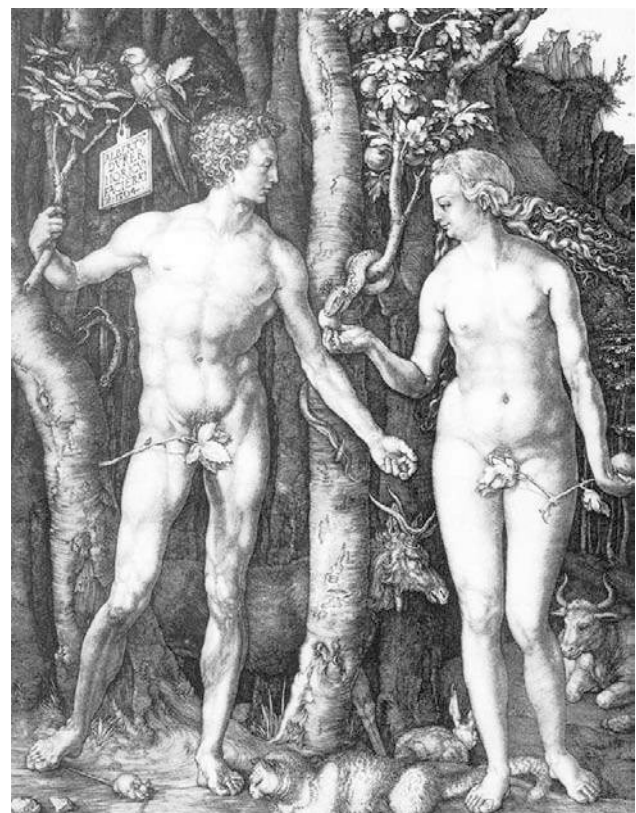
Among the aspects of culture distributed in printed books were the perspective devices

and projective technologies that enabled artists to make increasingly realistic images as the

Renaissance progressed.

Printed Pictures: Mass Medium Technology of the Perspective Age

A printed picture is one that can be multiplied without any change from the original

image. During the fifteenth and sixteenth centuries, printed pictures took three forms: woodcuts,

etching, and engravings. (See **3.33** for diagrams of each of these forms.) We have seen that the

first printed picture technology used in the West was the woodblock. During the Gothic period, it

was used principally for pictures of the saints (as discussed in Chapter 2) and for playing cards.

3.33a Albrecht Durer, woodcut print of a rhinoceros, 1515.

By the end of the fifteenth century, artist began to use woodcuts, etching, and engravings for perspective images. The impact of these mass-produced perspective images can be compared to the impact of the mass-produced words of the printed Bible: they gradually but inevitably changed people's expectations and outlook on all aspects of life. The greatest printmaker of the Renaissance was the German artist **Albrecht Durer** (1471-1528, **3.34**). His

3.34 Durer, *Self-Portrait,* **1500.**

work illustrates the wide range of influence printed images had on the culture of the Renaissance.

Albrecht Durer: Printed Images as Fine Art

Durer combined the Italian love of the idealized human figure with his own Northern love for natural detail. Although his earliest works show the flat space of medieval art, Durer admired the new technique of perspective so much that he became a master of it, and through his etchings, engravings, and woodcuts, he also became its chief advocate throughout Europe.

Durer's woodcut *Man Drawing a Lute* (1525) is from the book he wrote on perspective (**3.35**). This woodcut not only illustrates principles of perspective, it also shows an early form of

3.35 Durer, *Man Drawing a Lute*, 1525.

mechanizing the perspective technique that was developed long before photography. The print documents the eagerness of Western artists to invent and use machines that would help create perspective images. Durer did not initiate the use of perspective devices with his book; it is possible, for example, that Michelangelo used such a device to achieve the radical foreshortening in the Sistine Chapel image of God flying toward the spectator.[32]

A second device illustrated in Durer's book is a wooden frame containing a pane of glass divided into a grid (**3.36**). The artist looks through each portion of the grid and copies what he sees onto a similar grid drawn on a sheet of paper. In order to make certain he is always holding his head in the same position--and thereby always looking at the object from the same viewpoint--the artist keeps his eye lined up with the vertical stick he has erected near the frame.
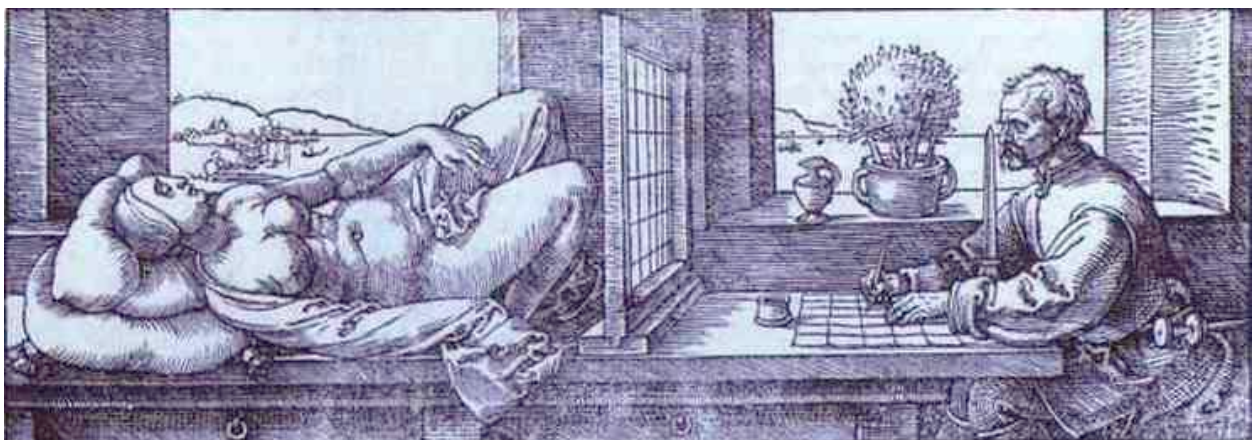
3.36 Durer, artist using illustration device with grid.

Durer's devices point to the objectification process of linear perspective. The artist selects and frames the image from a fixed viewpoint outside the space he is depicting. The

viewer, mimicking the artist, is also in a fixed position separate from the space. (In a similar fashion, television artist select what they point their cameras at. We viewers are in a separate space outside the image space.)

But objectification is never a neutral process. In both cases, Durer portrays a white male as the agent of creative action. The "object" being portrayed in the illustration of the gridded device is a passive female. The male actor and female object of his gaze are separated by the perspective image-making process.

3.37 Durer, *Saint Jerome in His Study.*

Durer's engraving *Saint Jerome in His Study*, though not totally accurate in its perspective (the potted plant hanging from the ceiling, for instance, is shown at too steep an angle), is one of his print masterpieces (**3.37**). The space is centered on the heroic figure of the saint. The subtle range of dark and light tones creates a mood of serenity that reflects the saint's contemplative absorption in Scripture. Notice the shadows form the pattern of the bottle-glass windows on the window frames and sills.

This print also illustrates the distinction between fine art and popular art that began to take form at this time. Like Durer, many artists made prints that demonstrated the same skill and sense of personal vision as the more valuable oil paintings. In fact, artists often made prints on the same themes as their famous paintings. These were collected by upper middle class and wealthy buyers. In contrast, printed images of scenes from the lives of saints, like today's posters and picture magazines, presented images of heroes that almost anyone could afford; they were sold at fairs "one penny plain, two penny colored" (**3.38**).

3.38 Durer, examples of his one (uncolored) and two penny (colored) prints.

As the public art sponsored by the Church began to decline in importance, the division between fine art and popular art became even more significant. Oil paintings and prints by famous artists were usually displayed in private spaces, like palaces or the homes of the affluent. This distinction between fine art and popular art grew until the mass media of the twentieth century again enabled fine art and popular art to share the same public space.

The main impact of printed images did not stem from art, however. It was the cumulative impact of all the informative, technical, entertaining, and artistic images together that was important. Their wide distribution and their common base in perspective gradually taught all classes of people to expect a new level of factual detail in images, and this expectation applied to all images, whatever their primary purpose.

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William Ivins, former curator of prints at the Metropolitan Museum of Art in New York, draws attention to the impact of printed pictures, an impact that goes far beyond that of the masterpieces that we today honor as fine art in museums.

"The printing of pictures, however, unlike the printing of words from movable types, brought a completely new thing into existence…It is hardly too much to say that since the invention of writing there has been no more important invention than that of the exactly repeatable pictorial statement."[33]

Ivins notes that the great Greek philosopher Aristotle took a team of artists on one of Alexander the Great's campaigns so that he could collect and disseminate drawings of plants from countries far away from Greece. His project was abandoned when it turned out that these drawings, when copied from other drawings instead of from the actual plant, quickly lost their accuracy of detail.

The problem was something like the game of Rumor played at parties. The first person whispers something to the next person. That person then whispers what he or she has heard to the next person, and so on around the room. The humor in the game comes when the final person repeats the rumor, which is seldom anything remotely like the original repeated message. The Greek artists' copied drawings became more and more like mere "rumors" of the plants. This lack of a technique for printing pictures might have been itself enough to stall Greek science at this point even it no other factors had blocked its development (**3.39**).
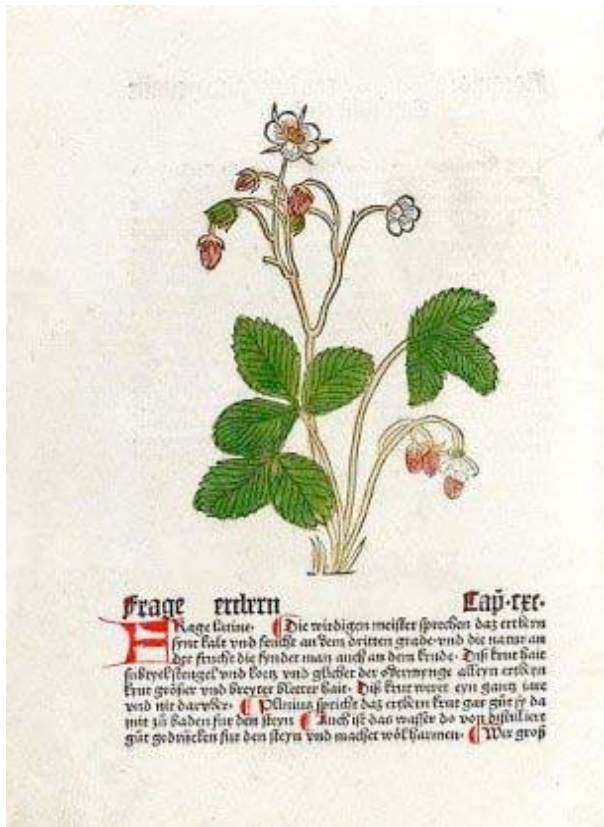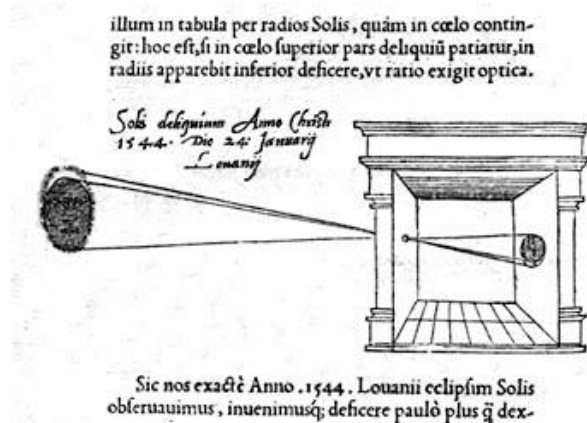
**3.39 Anon., "Strawberry plant," woodcut
illustration from Gart der Gesuntheyt.**

Repeated copying inevitably resulted in distortion. Printed multiples eliminated such distortion. The Renaissance use of printmaking technology achieved the goal that had eluded the Greeks: scientifically accurate illustration. The mass medium of printmaking was a major factor behind the explosive growth of Western science that took on increased momentum during the sixteenth century. Among the scientific advances recorded and disseminated in printed books were new insights about optics.

Printed Books & Projective Technologies

Leonardo da Vinci wrote about optical phenomena extensively in his notebooks. He designed a potter's wheel for making concave mirrors with a large focal length. He also wrote about the capacity of the camera obscura to project images into a darkened room. Leonardo punctured a hole in the wall of a sunlit building and saw images of the illuminated objects projected onto the opposite interior wall (**3.40**). As he described it: "I say that if the front of a building—or any open piazza or field—which is illuminated by the sun has a dwelling opposite to it, and if, in the front which does not face the sun, you make a small round hole, all the illuminated objects will project their images through that hole and be visible inside the dwelling on the opposite wall which may be made white; and there, in fact, they will be upside down…"[34]

Later, Leonardo compared this phenomenon to human vision: "the same takes place inside the

pupil [of the eye]."[35]

Within a few decades after Leonardo wrote his notes, published books spread information about these technologies to scientists and artists throughout Europe. Leonardo himself may have been familiar with early eleventh century Arab scholar Alhazan's *Opticae thesaurus*, a book which combined discussion of Greek optics with

3.40 Camera Obscura illustration.

reports of Alhazan's own research. The 1572 printed edition of Alhazan's book included an imaginative illustration depicting Archimedes using "burning mirrors" (concave mirrors) to destroy the Roman fleet. To one side is a man using a concave mirror to project an image of his head into the air (**3.41**).[36]

3.41 Reflecting one's head in the air by using a burning mirror.

But artists were aware of projective technologies long before Leonardo's notes were written or Alhazan's book was printed.

Contemporary artist **David Hockney** argues that a notable "change to greater naturalism occurred suddenly in the late 1420s or 1430s in Flanders."[37] Hockney attributes the change to artists' use of optics and uses Jan Van Eyck's paintings to "prove" his (still controversial) assertion. He suggests that artists like van Eyck used concave mirrors as tools for creating their astonishingly "optical" images.

Hockney notes that artists and lens-makers were often in the same guilds (guilds were labor organizations antedating the unions). He writes, "Lenses and mirrors were still rare then, and artists would have been fascinated by the strange effects they produced. As people who made images, they must have been amazed that whole figures, even whole rooms, could be seen in just a small convex mirror. Surely it is no coincidence that such mirrors arrived in painting at the same time as greater individuality appeared in portraiture."[38] He points out that van Eyck knew about mirrors and lenses and depicted them in several of his paintings. There are convex mirrors in the *Arnolfini Wedding* (**3.42**) and in a 1436 portrait of Canon van der Peale, whom Van Eyck portrays holding dark-rimmed eyeglasses (**3.43**).


3.42 Van Eyck, detail of *Wedding*.

**3.43 Van Eyck, detail of
Canon van der Peale.**

Hockney relates what he calls "a Eureka moment" in May 200, when optical scientist Charles Falco pointed out, in the artist's studio, "that a concave mirror has all the optical qualities of a lens and can project images onto a flat surface." (A concave mirror is made from the same rounded glass as a convex one, but has the silvering agent applied to the other side of the glass.) Hockney and Falco "used a simple shaving mirror—the only known domestic use for a concave mirror—to project images onto a wall. We could see them so clearly…" Hockney began to experiment. He created a window like those in many Flemish portraits, set up the

concave mirror, and positioned a friend outside the window, in brilliant sunlight (**3.44**). "Inside

the room, I could see his face on the paper, upside down but right way round and very clear."[39]
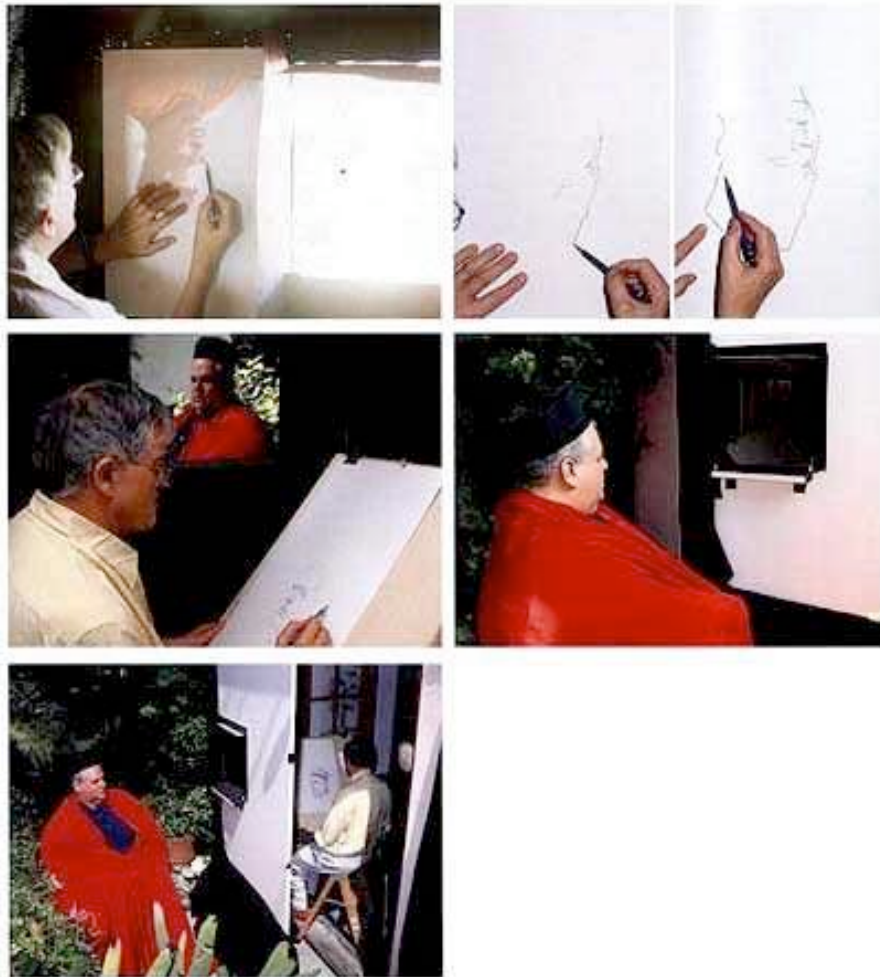
3.44 Hockney's example of using a concave mirror to project images.

Hockney's description of his experience echoes a passage in Girolamo Cardano's 1550

De Subtilitate: "If you wish to look at those things that are in the street, place a convex les in the

window when the sun is shining brightly, then having blacked out the window you will see the

images carried through the opening onto the opposite surface, but with muted colours. Therefore

place a very white paper in the place where you see the image and you will achieve the desired

effect with amazing results."[40]

3.45 Parmigianino, *Self-Portrait in Convex Mirror,* **1524.**

Almost a century after Van Eyck's paintings, Italian artist **Parmigianino** (1503-1540) created his *Self-Portrait in Convex Mirror* (1524) on a circular wooden panel that is 9 1/2" in diameter (**3.45**). The young artist is seen in a dark room, with light coming from a single window to the upper left. He sits looking directly at the viewer—or at the mirror, as he painted—with his hand on the lower edge of the frame. Because convex mirrors distort, the hand looks immense. The cuff of his sleeve, however, is astonishingly realistically rendered. Vasari wrote that the 21-year old painter created the convex image to demonstrate his skill in "the subtleties of art."[41]

There is no doubt that Renaissance artists used various tools and devices to help them make their images more realistic. We have seen that Durer's 1525 book included several such devices. Throughout the century, other authors introduced additional devices that artists could employ. For example, in his 1568 book on perspective, Daniel Barbaro included the camera obscura with lens in his description of artists' techniques.[42] (We will discuss the relationship of art and the camera obscura further in the following chapter.)

Martin Luther: Printed Books Inspire the Protestant Reformation

The Gutenberg Bible may have been the first major book published in the West, but the first "best-seller" was the printed copy of Martin Luther's *Disputation on the Power and Efficacy of Indulgences*, commonly known as *The 95 Theses*.

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3.46 Martin Luther.

Luther (1483-1546) was an Augustinian monk who served as theology professor and parish priest in Germany (**3.46**). In 1510, Luther traveled to Rome on church business, which means he was there while Michelangelo was working on the Sistine Chapel ceiling. Like most tourists to the sacred city, he purchased a printed guidebook and visited both the Roman ruins and the many pilgrimage churches. After his return to Germany, he became increasingly distressed by the practice of selling indulgences. Purchasing an indulgence enabled individuals to pay to have their sins pardoned, and thereby "buy" salvation, rather than go to confession and perform what Luther called "true inward repentance." The Church also allowed individuals to pay in order to shorten the time their relatives and loved ones spent in Purgatory. Pope Julius II sold indulgences to finance the monumental re-building of Saint Peters Cathedral.[43]

Finally, on October 31, 1517, Luther wrote a letter to church superiors urging an end to the abuse of indulgences. The new technology of the printing press played a major role in the spread of Luther's ideas. By the end of 1517, copies of the *Theses* had been printed in at least three German cities. The *Theses* were hugely controversial: in early 1518 over 800 copies were burned in Wittenberg.

Luther's *Theses* instigated ecclesiastical and political turmoil. He was excommunicated and declared a criminal, but he refused to back down. Claiming the right of individual conscience over the authority of the Church, Luther struck the symbolic blow that began the Protestant Reformation.

Chapter 3: Renaissance

"Unless I am convinced by scripture and plain reason, I do not accept the authority of the popes and councils, for they have contradicted each other...My conscience is captive to the word of God. I cannot and will not recant anything—for to go against conscience is neither right not safe."[44]

In response to the Protestant Reformation, the Catholic Church initiated the Counter Reformation, which generated some of the most important art in the period following the Renaissance, the period known as the Baroque.

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[1] Edgarton 145.

[2] Elton Davies, *Arts and Cultures of Man* (San Francisco: International Textbook Co., 1972) 370.

[3] Davies 370.

[4] Giorgio Vasari, *The Lives of the Artists*, trans. George Bull (New York: Penguin Books, 1965) 104.

[5] Leon Battista Alberti, quoted in William M. Ivins, Jr., *On the Rationalization of Sight* (New York: Da Capo Press, 1973) 22.

[6] Vasari 255.

[7] Kenneth Clark, *Leonardo da Vinci* (Hammondsworth, Middlesex, England: Penguin Books, 1973) 75.

[8] Donald Sassoon, *Becoming Mona Lisa, From Fine Art to Universal Icon—The Incredible Story of The World's Most Famous Painting* (New York: Harvest, Harcourt, 2002) 6.

[9] Sassoon n.p.

[10] Quoted in Sassoon 110.

[11] Sassoon 169.

[12] Patricia Simons, "Women in Frames, The Gaze, the Eye, the Profile in Renaissance Portraiture" *The Expanding Discourse, Feminism and Art History*, Norma Broude and Mary D. Garrard, eds. (New York: HarperCollins, 1992) 52.

[13] Mary D. Garrard, "Leonardo da Vinci, Female Portraits, Female Nature" Broude and Garrard 59.

[14] Ann Sutherland Harris and Linda Nochlin, *Women Artists: 1550-1950* (Los Angeles and New York: Los Angeles County Museum of Art and Alfred A. Knopf, 1976) 106.

[15] Elsa Honig Fine, *Women and Art* (Montclair and London: Allanheld & Schram, 1978) 9.

[16] Leonarod da Vinci, *The Notebooks of Leonardo da Vinci*, ed. Robert N. Linscott (New York: The Modern Library, 1957) 79.

[17] Leonardo da Vinci 35.

[18] Berger 16.

[19] Clark, *Leonardo da Vinci* 77-78.

[20] Quoted in Clark, *Leonardo da Vinci* 72.

[21] Clark, *The Nude* 56. Clark notes that the 7'4" tall Apollo Belevedere inspired the eighteenth century Greek Revival, and that it was rhapsodized by Johann Joachim Winckelmann and Goethe, among others.

[22] Ross King, *Michelangelo & the Pope's Ceiling* (New York: Walker & Co, 2003) 161.

[23] King 83.

[24] Clark, *The Nude* 59.

[25] Clark, *The Nude* 60.

[26] Clark, *The Nude* 61.

[27] King 57, 60.

[28] King 46.

[29] King 46.

[30] King 115.

[31] Heinrich Wilhelm Wallau, *The Catholic Encyclopedia*, Volume VII, ed. K. Knight, Online Edition, 2003 <http://www.newadvent.org/cathen/11579s.htm>

[32] Ross King, p. 257.

[33] William M. Ivins, Jr., *Prints and Visual Communication* (Cambridge: MIT Press, 1969), 2, 3. .

[34] Hockney 207.

[35] Hockney 207.

[36] Hockney 210.

[37], Hockney 71.

[38] Hockney 72.

[39] Hockney 74.

[40] Hockney 208.

[41] Frederick Hartt, *History of Italian Renaissance Art* (Englewood Cliffs, NJ: Prentice-Hall, 1974) 516.

[42] Hockney 209.

[43] King 29.

[44] <http://www.wittenberg.de/e/seiten/ablass.html>