ART

A 'Resurrection' of Science and Art

The painting was over 500 years old. Sarah Fisher's forefinger reached to touch the surface. "You see," she began—

At any moment, I expected to see flashing "Do Not Touch!" signs, accompanied by alarm bells, and a protective swarm of museum guards.

But the room remained silent. Fisher continued, "I've cleaned the layers of old varnish from about half of the surface. . . . It was so dark and discolored, and the varnish was so yellow and murky, and it hid the quality of the painting completely, and it also hid all the damage." Fisher, head of Painting Conservation at the National Gallery of Art (NGA) in Washington, D.C., was bringing this painting of "The Raising of Lazarus" by the Fifteenth-century Renaissance artist Benozzo Gozzoli, back to life. By so doing, restorers like Fisher preserve and transmit the precious cultural artifacts of the past, in a way echoing the artist/scientists of the Renaissance, who studied and revived the literary and artistic works of the Greek Classical period.

For, the Golden Renaissance itself was the rebirth of Classical art and science, and self-consciously so.

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In the early years of the Fifteenth century, when the young Filippo Brunelleschi was thinking about how to construct the huge cupola over the nave of the Cathedral of Florence, he journeyed to Rome, to study the ancient Roman buildings—especially the Pantheon, with its large rounded dome, still standing 1,300 years after it was built by an unknown, although probably Greek architect/engineer, in about 120 A.D. Later, when the young Leonardo da Vinci was apprenticed to the artist Andrea del Verrocchio in the 1460's, he would have copied his master's sculptures and paintings, before attempting to create his own works.

Even today, art students will copy the paintings and sculpture of the Great Masters, to learn their secrets. And all of us, even if we are not trained artists, are privileged to enjoy works that may be hundreds, or even thousands, of years old.

And today, such techniques as electron spectroscopy, x-radiography, infrared reflectography, and microscopy, aided by computers, are available to assist conservators in restoring masterpieces to an approximation of their original condition, so that the public, as well as art historians and other professionals, can continue to study and enjoy the greatest artworks of the past.

Here in Washington, D.C., for example, we are extremely fortunate to have at the National Gallery one of the rare paintings by Leonardo da Vinci—the portrait of "Ginevra de' Benci," painted in 1474, when Leonardo was about 22 years old. This portrait was already nearly 500 years old, when it was purchased by the Gallery in 1967. It is the only painting by Leonardo in the Western Hemisphere, although there are many drawings scattered among museums in the United States. Leonardo executed barely more than a dozen paintings in his lifetime.

When the "Ginevra" arrived at the National Gallery, it was covered with a yellow varnish, which had darkened over the years. In 1991, the conservators decided to clean the painting. This decision was not taken lightly, since the general rule for conservation of works of art, is the same as that of medicine: First, do no harm. In other words, don't touch a masterpiece, even if it is covered by layers of protective varnish, earlier repairs, and even repaintings, unless it is absolutely necessary, and, it has been determined after careful examination, that the intervention will not cause an irreversible loss of the original media.

In the case of the "Ginevra," the Gallery found that it was in remarkably good condition, despite its age. The only irreparable damage was the mutilation, about 200 years earlier, by an owner who cut off the lower one-third of the painting, destroying the composition's proportions by eliminating Ginevra's arms and hands. Leonardo's other portraits of women—the "Lady with an Ermine" and the "Mona Lisa" are both half-length, and include the hands, which Leonardo believed to be as essential as the face in giving expression to the character. (Think of the role of the hands in

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Sarah Fisher shows "Eunostos of Tanagra," by the Master of the Griselda Legend, 1495/1500.

giving life to the emotional reactions of each of the Disciples in Leonardo's "Last Supper.") A drawing in silverpoint in the Windsor Castle collection, done the same year as the "Ginevra," is thought to have been a study for the portrait's hands. The Gallery has used computer imaging to recreate what the painting would have looked like, before it was cut down [SEE illustration].

Then, when NGA scientists subjected "Ginevra" to infrared and ultraviolet photography and x-radiography, two surprising discoveries were made: First, the revealed underdrawing showed that Leonardo used a "pouncing" method to transfer his drawing to the canvas. Most likely, Ginevra posed for him in her home in Florence, where Leonardo would have made his drawing, or perhaps several; he would then have taken the drawing back to his studio, and, by making pinpricks along the outlines of the drawing, transferred the drawing to a panel, by "pouncing" the surface with a small bag of charcoal dust, to leave a dotted outline on the canvas. Thanks to today's technology, it is possible to see the working technique of this Renaissance genius—the computer images show precisely such pouncing dots around the eyes and lips of Ginevra [SEE illustration].

Even more exciting to conservators, was a fingerprint of Leonardo himself, left in the paint. Leonardo would use his finger, placed directly on the paint, to soften the outline between an object and the atmosphere around it, a technique he called "*sfumato.*" This blurring of outlines creates a slight impression of *motion;* it was Leonardo's invention, based on observations described in his *Notebooks,* that the eye does not see sharp outlines. Elsewhere, in his notes on painting, Leonardo says, that light and shade should blend "without lines or borders, in the manner of smoke [*fumo*]."

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National Gallery of Art, Washington, Ailsa Mellon Bruce Fund

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Leonardo da Vinci's "Ginevra de' Benci," 1474. **Above:** *Computer reconstruction as figure in half-length.* **Top right:** *Infrared detail shows pouncing dots around the eye.*

The Brancacci Chapel

One of the most important restorations of the past quarter century was that of the fresco cycle, *The Life of St. Peter,* in the Brancacci Chapel, in the church of Santa Maria del Carmine in Florence (c. 1425), which was restored in the 1980's. The cycle is the work of the painters Masolino and Masaccio, who collaborated on a number of the frescoes, and of Filippino Lippi, who completed the unfinished ones. Over time, the frescoes had become badly damaged, particularly by soot from the candles burned in the church for over 400 years, as well as by other environmental factors. Then, there was also damage from numerous earlier "restorations," overpaintings, and cleanings.

So many of the frescoes on the walls of Italian churches have survived, because the fresco (Italian for "fresh") technique makes the painting relatively permanent. In true, or *buon fresco,* the artist applies water-based paints directly onto the wet plaster of the wall, which then dries with the wall and becomes "permanent." Only as much wet plaster as the painter can finish in one day is applied to the wall (this is called a "*giornata,*" meaning a day's work), and then that section is painted. As long as the wall is still standing, the painting will be there. But, the vicissitudes of weather, moisture, and other factors, can cause damage to the wall, and to the paint. Colors can fade or darken, or, as with the Brancacci chapel, soot or other conditions can cause the fresco to deteriorate. Thus, even paintings done in the *buon fresco* manner, will change in appearance over time.

This is not an insurmountable problem, so long as the original paint has not been damaged. Most frescoes can be returned to a reasonable approximation of their original condition through restoration (although, like anything that ages, there will be the inevitable signs of wear and tear). It has only been in the last half-century, or so, that advanced methods of chemical analysis of paints, varnishes, canvases, and so forth, have been available to aid the restorer in

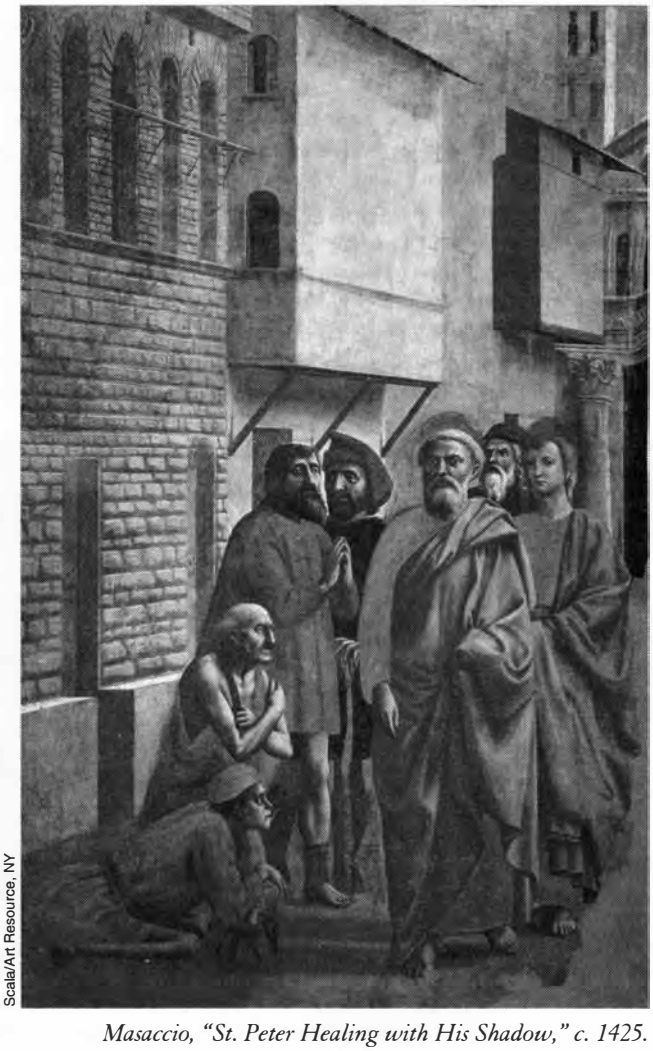
determining whether, and how, to carry out a restoration.

One of the most dramatic discoveries to emerge from the cleaning and restoration of the Brancacci Chapel, concerned Masaccio's "St. Peter Healing with His Shadow" [SEE illustration and front cover, this issue], a fresco based on the New Testament Acts of the Apostles: "Insomuch that they brought forth the sick into the streets, and laid them on beds and couches, that at the least the shadow of Peter passing by might overshadow some of them" (Acts 5:15).

In 1771, fire destroyed much of the Church of Santa Maria del Carmine. Miraculously, the Brancacci Chapel in the right transept of the church was spared. But, although they were not destroyed by the fire, the frescoes were damaged by smoke and heat. Over the next two centuries, the resulting layers of grime were coated with "protective " varnish and repainting. Coincidentally, in 1748, long before the fire, a large Baroque altar had been mounted on the rear wall of the chapel, which partially covered a section of the paintings. When the decision was made in 1980 to clean and restore the frescoes, the first step was to remove the altar.

Lo and behold! What the restorers discovered, overturned everything written up to that time about the Chapel frescoes. Moving the altar revealed an entire section of "St. Peter Healing with His Shadow," in fine condition, as it had been protected from the fire and subsequent attempts at repair. It was now possible to see, for the first time in more than 200 years, the façade of a Classically designed church, a bell tower, a column crowned with a Corinthian capital, and a section of blue sky, painted in Masaccio's clear, fresh colors. With the altar removed, and cleaning of the fresco completed, the restorers were amazed to see that the familiar scene from the Acts was not set in a poor, dingy city slum, as it had appeared for two centuries, but rather, in an open, sunlit Florentine cityscape, the most realistic ever depicted up to that time.

The miracle described in the Acts comes alive in Masaccio's rendering: St. Peter's shadow heals the sick as he walks along the familiar streets of Florence—for example, the building Peter passes on his right is identifiable as the palace of the powerful Strozzi family. The Classical architecture of the now-visible church, along with the sophisticated perspective of the entire fresco cycle, demonstrates the influence of Filippo Brunelleschi, who by that time had already collaborated with Masaccio on the architectural setting depicted in the latter's revolutionary "Trinity" fresco in Santa Maria Novella (c. 1425). Masaccio's Classically modelled figures also reflect the influence of Donatello, the young sculptor who accompanied Brunelleschi to Rome in 1401, where they studied Roman copies of Greek sculpture.



Scala/Art Resource, NY

Masaccio, "St. Peter Healing with His Shadow," c. 1425.

'In the Mind of the Artist'

In the months before his death in 1497, the Florentine artist Benozzo Gozzoli painted a "Raising of Lazarus" [SEE inside back cover, this issue]. It is a small (about 25″ × 32″) oil painting on canvas; its palette reflects the clear, sun-drenched colors of the Tuscan landscape: rich blues, reds, and ochres. Light fills the scene, as the miracle of Lazarus's resurrection evokes a range of responses on the faces of the crowd gathered to witness it.

Today, Benozzo's painting sits on an easel in the conservation workshop behind the public galleries of the National Gallery, which has owned it since 1942. The painting of Lazarus is itself being "resurrected," under the skilled hand of Sarah Fisher, head of Painting Conservation at the Gallery. The work, which had been reduced to a nearly uniform yellow-to-brown color range by layers of varnish and overpainting from previous restorations, is being given new life, as the original palette of Benozzo is revealed on the right half of the canvas. Fisher expects "Lazarus" to be fully restored in about two years.

At the time of our visit, in November 2002, Fisher had spent about three weeks painstakingly removing layer after layer of varnish and overpainting from the painting's surface. This work is done by placing the canvas under a microscope and, with a handmade cotton swab, carefully applying a solvent to the surface, and removing, ever so delicately, the layers on top of the original paint. Often, once the surface is exposed, areas are

uncovered where virtually all of the original paint is lost, usually the result of a previous restorer's overzealous cleaning. In such cases, a process called "inpainting" may be undertaken, where the restorer carefully matches the color and texture of the original paint, and meticulously "paints in" the missing color, or applies a pale wash which blends with surrounding colors (this was done in the recent restoration of Leonardo's "Last Supper" for example).

Each step of the restoration process is carefully recorded, so that future art historians and restorers will be able to see exactly what was original, and what was added. Needless to say, in past times such care was not taken. Today's technology makes it possible to detect almost everything that was done previously to a painting, even in the absence of such records.

The art restorer faces an enormous challenge, when approaching the restoration of a work of art. An array of skills—a marriage of art and science—are called for. In Fisher's words, the restorer must put herself "in the mind of the artist," a process which can be likened to the performance of a great piece of Classical music—the performer must discover what was in the mind of the composer, in order to perform the composition. Moreover, a veritable "orchestra" of instrumentalists—art historians, scientists, technicians, color analysts, and so forth—work together to return a work of art to as close to its original condition as possible. In fact, most of the works of art you see in a museum, be they paintings, sculpture, altarpieces, etc., have undergone some form of conservation/restoration, before being displayed to the public; some have undergone many such procedures.

Benozzo's 'Lazarus'

Benozzo's "Lazarus" was an unusual painting for this artist, and even for the period, because it was done in oil on canvas. Only in the last quarter of the Fifteenth century did oils come into use in Italy, when oil paintings from northern Europe, like those of the Flemish painter Jan van Eyck, began circulating. (Leonardo da Vinci was so taken by the beauty and richness of the oil colors, that he attempted to incorporate them into his fresco of the the "Last Supper," painted about the same time as Benozzo was working on the "Lazarus"—to famously disastrous results!) "Benozzo, as far as we know, only did two paintings in oil on canvas, very late in his life. All of his earlier paintings are tempera on wood, or fresco—he's well known for his frescos," according to Fisher.

The "Lazarus" had been in storage for the last 30-odd years. Fisher described its condition when she began to clean it: "Usually we can tell where damages are in paintings using x-radiography. But in this case, in order to help the fragile original canvas, to give it some support, it was restored many years ago—probably 50 years ago at least—by gluing a new canvas onto the back, and that new canvas had a lead-white layer on it, it was pre-primed with a lead-white layer. That lead-white does not allow x-rays to penetrate through the composite. So we couldn't see anything when we looked at the painting with x-rays. So, we just didn't know quite what the extent of the damage was. I estimated, in looking through the old varnish, that it was probably in better shape than used to be thought."

Fisher then described what she discovered, as the old yellow varnish began to be removed: "We were all pleasantly surprised by how beautiful the original paint is. It's very delicately applied—it's almost like water-color, and it's done in lovely, sort of sketchy strokes. Taking off the old varnish, really reveals the high quality of the painting. And also, during that process, I also remove all the old retouchings, the old restorations, which by now have become really discolored with time, so they no longer match the original paint, the way they must have in earlier times. They probably matched perfectly when the earlier restorer first put them on. But, with time, all of these materials age and change color."

Fisher is cleaning the "Lazarus" down to the original paint, because, "there are a lot of old overpaints on it that were applied directly onto the original paint, and aren't separated from it by any varnish layers. So to get them off, I pretty much have to go down to the original paint." The restorer has to use different solvents to remove the overpaints, "because they are usually made of a tougher material than varnish. . . . They might be painted in tempera, or they might be painted in oil. . . . In some cases I can use a specific solvent to get them up, but other times, they're so tough, but yet they cover so much original, and I want to reveal as much of the artist's original as possible, so I delicately pick them off with a little scalpel under the microscope."

When Sarah Fisher completes the restoration of Benozzo's painting, it will be hung upstairs in one of the galleries dedicated to the NGA's extensive Italian Renaissance collection. Then, the public will have the pleasure of viewing this 500-year-old masterpiece, as the artist first painted it.

—Bonnie James

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Fisher demonstrates the microscopic process of cleaning Benozzo Gozzoli's "Raising of Lazarus," 1497.