SMITHSONIAN

IN YOUR CLASSROOM

SPRING 2004

History through Primary Sources

EVERY PICTURE HAS A STORY

✳ Smithsonian Institution

CONTENTS

Smithsonian in Your Classroom is produced by the Smithsonian Center for Education and Museum Studies. Teachers may duplicate these materials for educational purposes.

The lessons address the following standards:

NATIONAL SCIENCE EDUCATION STANDARDS, GRADES 5–8

Content Standard F
Fundamental Concepts

Technology influences society through its products and processes. Technology influences the quality of life and the ways people act and interact. Technological changes are often accompanied by social, political, and economic changes.

NATIONAL STANDARDS FOR HISTORIC THINKING, GRADES K–12

Standard 1

The student thinks chronologically. Therefore, the student is able to:
• Distinguish between past, present, and future time.

Standard 4

The student conducts historical research. Therefore, the student is able to:
• Formulate questions from encounters with historical documents, photos, and other records from the past.
• Obtain historical data from a variety of sources, including historical photos.
• Interrogate historical data by determining by whom and when it was created.

McREL LANGUAGE ARTS STANDARDS, GRADES K–12

Standard 9

The student uses viewing skills and strategies to understand and interpret visual media.

The Smithsonian Institution was founded in 1846, six years after photography arrived in America. From the beginning, photographs were part of the Smithsonian collections. The oldest Smithsonian-related photograph predates the oldest Smithsonian building—it is a picture of the architect's model. Today, our museums and archives house more than 13 million photographs.

This issue of *Smithsonian in Your Classroom* closely examines four of the 13 million. Merry Foresta, the Smithsonian's senior curator for photography, selected the pictures to represent four important steps in the history of the medium:

- the introduction of portrait photography
- the invention of a photographic printing process
- the capture of instantaneous action
- the advent of home photography

Spanning less than fifty years, the pictures show the technology becoming at once more sophisticated and more widely available. In the beginning, photography was in the hands of a few professionals skilled in chemistry and optics. By 1900, nearly everyone could own a camera and could take a picture just by pushing a button.

In this story, there are parallels to the development of other forms of technology. In an interview on page 20, Merry draws comparisons to the uses of computers in our time. We hope that the issue will be helpful in any broad study of technology and society.

Model of the Smithsonian Castle, ca. 1850

In the issue's lessons, students see that, while not every picture tells its own story, every picture has a story behind it. In the first lesson, they make observations and inferences about the pictures. In the second, they use their predicting skills to try to determine the chronological order of the pictures. Therefore, the background information on the next two pages and the "Another Look" pages (5, 7, 9, and 11) should not be shared with the students until the end of the second lesson.

A Web version of the issue is at **www.Smithsonian Education.org/Educators**. It includes printable photographs and graphic organizers.

A recently published book, Merry Foresta's *At First Sight,* contains more than two hundred Smithsonian photographs. In the next few years, a traveling exhibition of the same name will take these pictures across the nation.

THOMAS EAKINS AND FRANCES EAKINS, 1851

French theatrical painter Louis-Jacques Mandé Daguerre introduced the first practical method of photography in 1839. Earlier photographic experiments yielded images that quickly faded away or that required hours and hours of exposure—so much time that the movement of the sun caused blurring. Daguerre's images, which he called daguerreotypes, were permanent impressions on silver-coated copper plates. They required about thirty minutes of exposure. By the 1850s, technical improvements had reduced the exposure time to less than thirty seconds.

This childhood portrait of the American artist Thomas Eakins and his sister Frances is a typical daguerreotype. The subject matter of these early photographs was limited by the long exposure, the difficulty of controlling light with the camera, and the lack of a means of printing the image. With a few exceptions, daguerreotypes were stiffly posed portraits produced in a studio. Like a painted portrait, each daguerreotype was a unique object—the copper plate itself was the medium for the image, so the image could not be reproduced.

The daguerreotype brought a new democracy to portraiture. The people we know from painted portraits are mostly the rich and famous. By the 1850s, one could attain this kind of immortality— a permanent visual record of oneself—for less than a penny.

SAN FRANCISCO, CORNER OF CALIFORNIA AND MONTGOMERY STREETS, 1857

This photograph was probably commissioned by the Pacific Express telegraph company, which had just been established in the building in the foreground. It is a paper print of a negative image developed on a "wet plate," a heavy glass plate coated with the sticky substance collodion.

The wet-plate process, introduced in 1851, was an advance over the daguerreotype's direct impression on a copper plate. Because it was easier to control light with a wet-plate camera, photography began to move outside. Because the photographer could make an unlimited number of prints of the negative image, photography began to move from the private to the public realm. The wet-plate process gave rise to photojournalism. During the Civil War, Mathew Brady's team of photographers gave the world the first extensive documentation of battlefield scenes.

Still, there were great limitations to the process. The plates had to be developed immediately. A photographer working outside had to set up some kind of darkroom, usually a tent. The exposure time, five to fifteen seconds, was too long to capture motion, which accounts for the quietness of this street in the rollicking boomtown of San Francisco. Pedestrians were moving too quickly to be seen.

HORSE IN MOTION, 1887

In 1872, Leland Stanford, former governor of California and a breeder of racehorses, hired San Francisco photographer Eadweard Muybridge to make a study of one of his horses at full gallop. At the time, photographers were still using the wet-plate process, with its slow exposure. Muybridge designed a camera with a very wide lens to take in as much light as possible. He set up twelve of the cameras along the racetrack at Stanford's horse farm. He attached a string to the shutter of each camera and ran the strings across the track. As the horse came down the track, bursting through the strings, the shutters snapped one by one.

In those first pictures, Muybridge could only record shadow images of the horse, but he captured, for
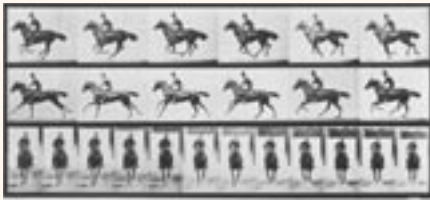
the first time in history, actions so rapid that they cannot be seen in life. As he continued his studies of motion, he took advantage of great technical advances in photography. In the late 1880s, when he created the pictures here, he was working with the latest thing, gelatin-coated "dry plates." The gelatin was much more sensitive to light than collodion. The plates allowed for exposure as fast as 1/2,000th of a second.

Pictures of motion led, ultimately, to motion pictures. Even before the invention of photography, there were machines that worked on the principle of the movie projector—a series of drawings whirling on a wheel gave the illusion of movement. Muybridge's motion studies were the first photographs that could be used in such a machine.

GIRLS OUTSIDE, 1890s

In 1888, the Eastman Dry Plate and Film Company introduced a handheld camera, the Kodak, with the slogan "You press the button, we do the rest." The camera came loaded with a roll of gelatin-coated film. When the film was used up, the photographer mailed the entire camera to an Eastman factory. Eastman returned the camera newly loaded with film, along with prints of the pictures. *Girls Outside* is an early example of a genre born of the Kodak— the snapshot.

The first Kodaks cost $25—about $450 in today's money, or roughly the price of a low-end digital camcorder. In 1900, Eastman introduced the Kodak Brownie, which cost just a dollar. The factors that made cameras convenient and affordable were related to the technical advances that aided Muybridge's work. The exposure time of gelatin was so fast that the camera did not have to be held steady on a stand; it could be held in the hand. Gelatin did not require immediate chemical treatment. This freed the photographer from the development process.

And so began the mass manufacture of handheld cameras, for which there was a ready market in the America of the 1880s. As photography curator Keith F. Davis has written: "The rapid expansion of the middle class created an enormous pool of consumers with money, leisure time, and artistic inclinations. For them, photography represented a thoroughly up-to-date pastime, perfectly in keeping with the progressive spirit of the age."

Girls Outside took less than a second to expose. Before the 1880s, the world had to stop for the camera. By the end of the decade, amateur photographers had the power to stop the world for a moment.

A photograph captures a moment, but the photograph itself does not remain fixed in time—its meaning is forever capable of change.

Long after it was taken, this daguerreotype took on a special meaning in the history of photography. Thomas Eakins grew up to become a painter and a photographic pioneer. He joined Eadweard Muybridge in the study of motion. Later, he designed a machine that was a model for the movie projector. All that aside, the picture is very similar to hundreds of daguerreotypes in the Smithsonian's collections.
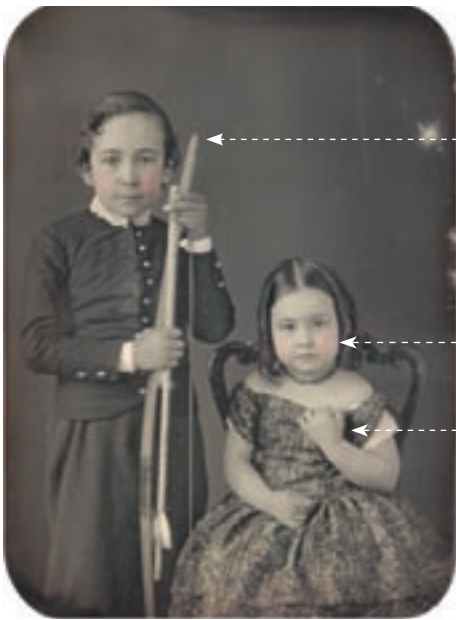
The daguerreotypists carried on the traditions of painted portraits. The sitters were often shown with *attributes*—objects that helped to express identity. The bow and arrow that Thomas is holding was a common symbol of masculinity for boys.

The photographer tinted the picture by hand. Here, as in many pictures, we see the art of photography straining against the limits of the technology. The wish to show life in all its color was always there.

The photographer probably told Frances to clutch her dress so that her hands wouldn't move during the long exposure time.

Portrait photographers still use props.

And they still use tricks to keep children from moving. This boy looks as if he is about to climb the ladder to do a little home repair. Actually, he's just holding himself steady for the camera.

Exposure is now instant, but the photographer snapped picture after picture so that the boy's parents would have many to choose from.

Smithsonian photography curator Merry Foresta recommends looking closely at the edges of a photograph. They are the borders between what we choose to include in the picture and what we choose to leave out.

It looks as if the photographer meant to include these things. They are dovecotes, where carrier pigeons were kept. The telegraph came to San Francisco around the time of this picture. Before, pigeons were used to carry messages.

Look! The building is the headquarters of the Pacific Express, the brand-new telegraph company.

Look! Here is one of the new telegraph poles.

San Francisco was a booming town in the 1850s. It is ten till three in the afternoon. Where is everybody?

Here is a Chinese immigrant in a rickshaw. Rickshaw drivers delivered telegraph messages around San Francisco.

Merry thinks this blur is a group of pedestrians who are moving too quickly to be seen. The exposure time for this picture was about fifteen seconds.
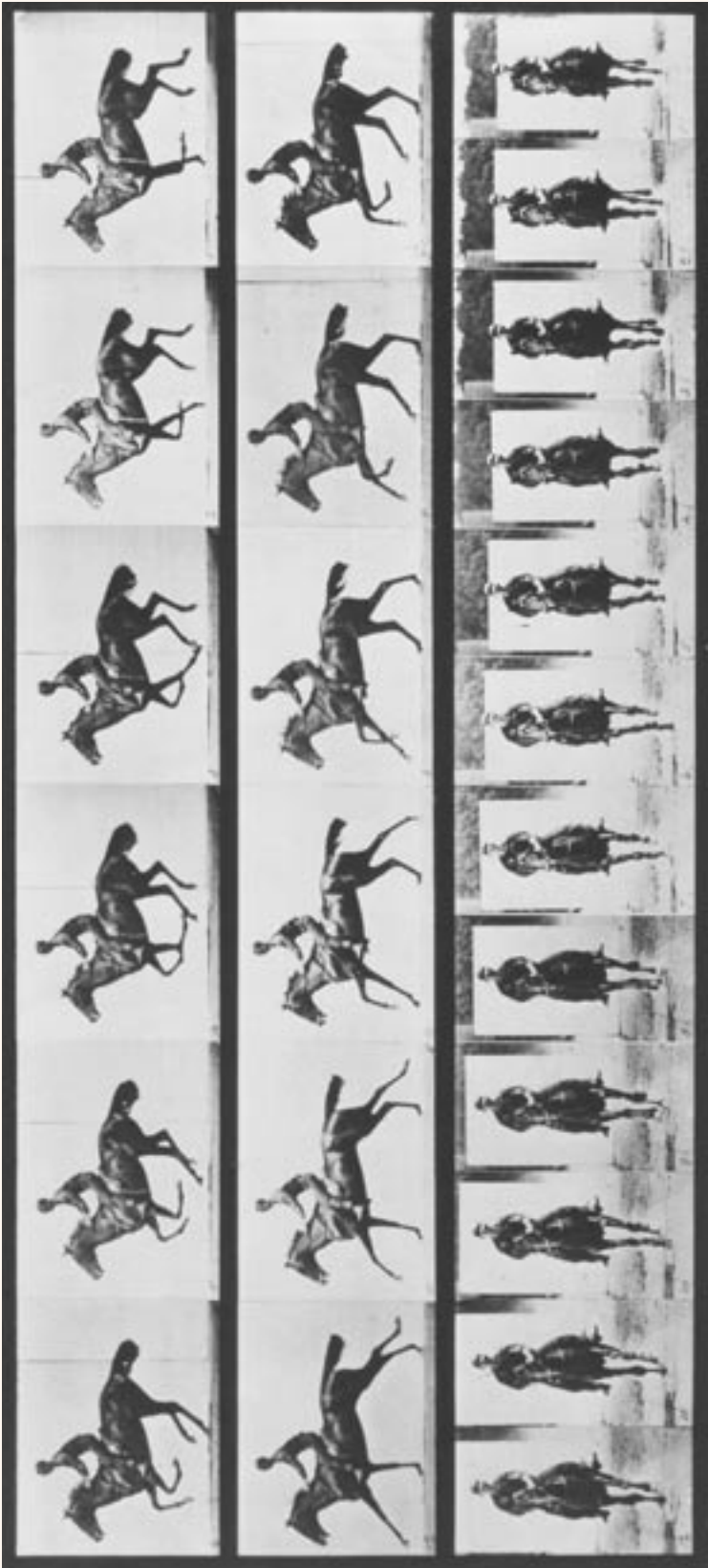
Shadows are cast by the buildings on the left. What might account for this isolated shadow?

Actually, it is not a shadow. It is probably an image of the buggy that is moving away from us. The buggy probably stopped there just long enough to show up as a dark spot.

The picture seems to tell the story of a new technology, the telegraph, replacing an old means of communication, the pigeon. Who would want to tell this story? Probably not someone in the pigeon business.

A method for printing photographs was invented in the 1850s. Photos could now be used for many purposes. The telegraph company probably hired the photographer. The picture may have been used as an advertisement.

As the story goes, Leland Stanford made a $25,000 bet that all four hooves leave the ground at once when a horse is at full gallop, and that he hired Eadweard Muybridge to prove this.

If the story is true, Muybridge won the bet for Stanford, as we see here.

So why didn't anyone see this before?

The horse's legs simply move faster than the eye can register the motion. Artists had shown horses airborne, but usually like this, with legs outstretched in what's called the rocking horse position.

As we see here, there is no such position for a horse.

Muybridge stopped the horse in mid-air. Painters began to depict horses in truer positions, as in this twentieth-century lithograph. But the achievement was bigger than this. Muybridge's work showed the world, for the first time, something in nature that passes unseen because it moves too fast.

Instant exposure changed the art form of photography, too. This picture by the Indian artist Raghubir Singh reminds us of a still-wondrous quality of the camera—its ability to freeze forever a moment so fleeting that it cannot be fully seen or felt as it happens.

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Who are these girls?
We just don't know. Merry Foresta found this picture in a
Smithsonian file. It had no date or any other information.

It is an early Kodak snapshot. The date, then, is later than
1888, when the Kodak went on the market.

THE KODAK.

ANYBODY can use the KODAK. The operation of making a picture consists simply of pressing a button. One Hundred instantaneous pictures are made without re-loading. No dark room or chemicals necessary. A division of labor is offered, whereby all the work of finishing the pictures is done at the factory, where the camera can be sent to be re-loaded. The operator need not learn anything about photography. He can "press the button"—we do the rest.
Send for copy of Kodak Primer, with sample photograph.

PRICE $25 00.

THE EASTMAN DRY PLATE AND FILM CO.,
Rochester, N. Y.

Smithsonian costume
curator Shelly Foote
thinks the clothing
dates it between 1890
and 1894.

The girls are outside,
but not by much. It's
likely that they stepped
out of the house to
take the picture. The
early Kodaks did not
come with a flash.
Indoor photography
was impossible.

What does the picture tell us?
To Merry, it offers "a glimpse into an informal Victorian situation."
There were a hundred pictures on a roll of Kodak film. Photography,
she says, became "cheap enough that you could do something silly."
In a very short time, people developed their own "picture rhetoric."

They learned to pose
themselves, in other
words, just as these
young women are
doing in a recent
snapshot.

**If nothing else, the picture is proof that people
in the nineteenth century, when left to their own
devices, did smile once in a while!**

In this lesson, students get into four groups. Each group is assigned one of the four photographs on pages 4, 6, 8, and 10. At first, they exercise their observation skills to list all the things visible in the photograph. Next, they shift focus to look more deeply and more imaginatively—they speculate on the setting, time period, and purposes of the photograph.

STANDARDS-BASED OBJECTIVES

- to formulate questions from an encounter with historical photographs
- to interrogate historical data by considering when and by whom it was created
- to use viewing skills and strategies to interpret visual media

Step One

Divide the class into the groups. Give each group a copy of one of the photographs, which, for these lessons, we've named *Children, Street, Horse,* and *Girls*. Give each student copies of Handout A and Handout B on pages 14 and 15. If possible, display the original photograph pages so that students can see the shadings of black and white.

Step Two

Ask students to use the first column of Handout A to list all of the things they see in the photograph. At this point, they should concentrate on facts, not make inferences. For example, *a boy* and *a girl* would be facts about *Children*. *A boy* and *his little sister* would be an inference. Encourage the groups to work as teams in order to list as many things as possible.

Tip: An often-used technique for closely studying images is to examine only one portion at a time. Students looking at a photo without much detail might cover one half of the image with a sheet of paper and then cover the other half. Students with a more detailed photo might look at one quadrant at a time, framing the quadrant with two sheets of paper at right angles.

Step Three

Ask students to use the second column of Handout A to list questions they have about the photograph—questions that cannot be answered just by looking.

Step Four

Students now begin to make speculations about the photographs. Ask them to work within their groups to complete Handout B, answering each of the questions and citing evidence to support the answers.

Examples: Students looking at *Children* might speculate that the setting is a photographer's studio and cite the formal pose and backdrop as evidence. Students looking at *Horse* might see the white wall as evidence that this picture, too, was staged. This would be a good deduction. Muybridge used the wall for contrast.

Step Five

As a class, discuss the groups' work. Which questions were most difficult to answer? What kinds of evidence supported the answers? What additional information is needed to confirm the answers? What sources might be consulted?

Ask students to remain in their four groups. In this lesson, they try putting the photographs in chronological order.

STANDARDS-BASED OBJECTIVES

· to obtain historical data from photographs
· to think chronologically
· to consider the relationships between technology and society

Step One

Give each group copies of all four Smithsonian photographs or display the photographs so that the whole class can see them. Tell the class that each group should try to put the photographs in chronological order. Encourage students to use any element of the image as evidence, including the general *look* of the photograph.

Step Two

Ask each group to write its chronological sequence on the board. In a class discussion, explore the reasons for any differences of opinion.

Step Three

After the discussion, give each group copies of page 18, which contains images of the kinds of cameras used to take the photographs.

Does this new information change anyone's mind about the chronological order? Why or why not? Does the size of the *Girls* camera tell us anything? Does it seem more like a modern camera than the others? Students might speculate that *Horse* is a series of frames from a movie, and that it is therefore the latest of the images. Do the *Horse* cameras change this idea?

Step Four

Give each group copies of Handout C, a data chart, and Handout D, a list of questions. The photos are in chronological order on the chart. Before revealing this, ask the class: Does the chart's new information establish the chronological order?

Ask the groups to discuss the questions on the list, then lead the class in a discussion of larger questions:

· What are some of the ways that changes in technology might have changed the purposes of photography?
· What are some of the ways that these changes might have changed life in the nineteenth century?
· Do you think people merely responded to the advances in photography, or do you think that a need for new technology led to the advances?

Encourage students to think about how the technology has continued to change. Students who note the relatively small size of the Kodak, for instance, might see this as part of an ongoing trend. (Some students might have heard that scientists have developed, for medical purposes, a camera pill!) What might be the reasons for the trend? Are there similar trends in other kinds of technology?

Step Five

Share background information on the four photos. If possible, display the "Another Look" pages (5, 7, 9, and 11). Have each group look again at its original photograph. Ask them to share some of the things they have learned about the photograph.

Return to the students' original questions on Handout A. Which questions have been answered? What sources might be consulted to find additional answers?

WHAT WE CAN KNOW BY LOOKING	QUESTIONS THAT REQUIRE RESEARCH

QUESTION	SPECULATION	EVIDENCE
What is happening in the picture?		
What is the setting of the picture?		
Who took the picture?		
Why was it taken?		
When was it taken?		

QUESTION	*CHILDREN*, 1851	*STREET*, 1857	*HORSE*, 1887	*GIRLS*, 1890s
How long did it take to expose the picture?	20–30 seconds	5–15 seconds	Less than a second	Less than a second
Did the photographer need to know how to develop the picture?	Yes	Yes	Yes	No
Did a professional or an amateur take the picture?	Professional	Professional	Professional	Amateur
What was new about photo-graphy in this period?	Pictures took less than an hour to expose and did not fade away	Pictures could be reproduced	Pictures could capture instant motion	Anyone could take pictures

In what ways did photography change?

In what ways did photography become easier?

Was there a change in the kind of people who took pictures?

Do you think this change was related to the changes in photography?

If so, why?

Write a summary statement about the changes in photography during this time:

_____

_____

_____

_____

Girls
4" high, 7" long

Street
14 1/4" high, 26" long

Children
6 1/4" high, 15" long

Horse
5 3/4" high, 22" long

The great step in photography in recent years is the advent of digital imagery. Photography had always been a matter of light impressing itself on a chemically treated surface. Digital cameras create images by converting light into numbers, which correspond to tone and color.

In practical terms, digital technology has given such immediacy to photography that there is almost no distance between the act of taking a picture and the act of viewing the picture. If we don't like how the picture came out, we can snap a dozen or a hundred more to get it right. Or we can manipulate the image on a computer to create something new.

This is a far cry from the technology of the daguerreotype. Merry Foresta writes: "The earliest photographs required exposures of several minutes—sitting before the camera demanded patience. Sometimes a brace kept the head from moving; often the sitter leaned against a table."

Many people got only one chance to sit for a photographer. If the sitter had a lot of work to do, so did the picture itself. "Books suggested wisdom, flowers complemented beauty, and a classical column signaled a noble character," Merry writes.

"As self-consciousness about posing increased, so did the desire to present the best self for the camera."

ESSAY IDEA

Ask students to imagine that, as in the days of the daguerreotype, they could have just one photograph to represent a family member, a friend, or the self. Assign a brief essay in which they describe this imagined picture by addressing the questions in the first lesson: What is happening? What is the setting? Who took the picture? When was it taken? Why was it taken?

A daguerreotype was treated like a miniature painting. It was set in a brass mat and covered with glass. The owner could keep this object in a case or hang it on a wall in an elaborate frame. Ask students, then, to finish the essay by telling where and how they would display the picture.

Afterwards, in a class discussion, consider if there are similarities between the imagined photographs and daguerreotypes. Do any of the imagined photographs express the personality, interests, or ideal image of the subject? Despite the differences in technology, do real photographs still serve these early purposes?

This picture says a great deal about its subject, according to the subject herself. Though it was taken in a portrait studio, the backdrop makes it look like she's outside. When she's inside, she's usually thinking about being outside. "There's a lot more stuff to do outside," she says.

This imagined picture is more like it!

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You've written that the camera changed the ways that people in the nineteenth century saw the world—that it broke down distances, as the telegraph did. Do you think, then, that the world itself changed as a result of photography?

One of photography's functions was to communicate information about other places and other cultures. The world did change. Photography made the world smaller. But a question remains: Did it also create distances between people? Pictures could be used as a substitute for travel. And that's another kettle of fish, because there are differences between real experience and picture experience.

What do you mean by "picture experience"?

In real life, experiences are one-to-one—between ourselves and the world. When we look at an image, we have to take into account a point of view not our own. We have to consider who made the picture, and why. It's important to know how to read images. We need to know that there is information beyond the photograph's frame.

You've written, too, that photography changed the way people looked at themselves.

Individual identity became a great value in the nineteenth century, and photography might have had a large part in this. When you have a picture made, you have to ask yourself: "How do I want people to see me? How do I want to be shown for posterity?" People in daguerreotypes look so grim. The long exposure time had a lot to do with this—you had to hold still. But I think we see something else—people taking the importance of this new technology very seriously. As the century went on, there was more familiarity with the camera. We see people posing themselves in bolder and bolder ways.

When photography was invented, artists, writers, and scientists all speculated about what effect the camera would have. I think none of them could have guessed the extent to which photography became part of daily life.

Do you see communications technology bringing similar transformations in our time?

The digital camera, the camera phone, the Internet— they all bring up this idea of the balance between the pictured world and the real world. With the Internet, we can gain access to almost any piece of information almost immediately. But again: Does this expand our reach, or does it encourage us to stay home and not experience the real world?

I think about this a lot here on the National Mall. Often I see a parent taking a digital picture and then the family gathers around to look at the picture of the scene that's right there in real life. Sometimes we are too busy looking at the pictured world to be fully in the moment.

Computer technology, like the camera in the nineteenth century, is an incredible tool for the dissemination of knowledge. It remains to be seen how much it will be a tool for creativity. It is only tool. It is only what we make of it.

WEB SITES

American Photographs: The First Century
americanart.si.edu/collections/exhibits/helios/amerphotos.html

Center for Media Literacy
www.medialit.org
(The Web site of this nonprofit educational organization includes classroom approaches to the interpretation of images.)

Freeze Frame: Eadweard Muybridge's Photography of Motion
americanhistory.si.edu/muybridge/

Helios: Smithsonian American Art Museum Photography Online
americanart.si.edu/collections/exhibits/helios/index.html

In the Steps of Esteban: Tucson's African American Heritage
www.library.arizona.edu/images/afamer/lessons/welcome.html
(This site includes lessons from the Smithsonian-affiliated Tucson Unified School District that might prompt ideas about teaching with historical photographs of your school or community.)

Secrets of the Dark Chamber: The Art of the American Daguerreotype
americanart.si.edu/collections/exhibits/helios/darkchamber.html

BOOKS FOR TEACHERS

Foresta, Merry. *At First Sight: Photography and the Smithsonian.* Washington, D.C.: Smithsonian Books, 2003.

Mora, Gilles. *Photospeak: A Guide to the Ideas, Movements, and Techniques of Photography, 1839 to the Present.* New York: Abbeville Press, 1998.

BOOKS FOR STUDENTS

Ages 4–8

Gibbons, Gail. *Click! A Book about Cameras and Taking Pictures.* New York: Little Brown, 1997.

Ages 9–12

Czech, Kenneth P. *Snapshot: America Discovers the Camera.* Minneapolis: Lerner Publications, 1996.

Gains, Ann Graham. *American Photographs: Capturing the Image.* Berkeley Heights, N.J.: Enslow Publishers, 2002.

Lowe, Jacques, ed. *Looking at Photographs: People.* San Francisco: Chronicle Books, 1995.

Pflueger, Lynda. *George Eastman: Bringing Photography to the People.* Berkeley Heights, N.J.: Enslow Publishers, 2002.

ILLUSTRATIONS

Cover: Detail from *Interior with Portraits* by Thomas Le Clear, ca. 1865. Smithsonian American Art Museum, purchase made possible by the Pauline Edwards Bequest.

Pages 1, 8, 18: Photographic History Collection, Division of Information Technology and Society, National Museum of American History, Behring Center.

Page 4 and details from portraits on 11: National Portrait Gallery. Matthew Perry by Mathew Brady Studio (right, page 11), gift of John O'Brien.

Page 6: *San Francisco, Corner of California and Montgomery Streets* by James Ford, ca. 1857. Smithsonian American Art Museum, purchase from the Charles Isaacs Collection made possible in part by the Luisita L. and Franz H. Denghausen Endowment.

Art on page 9: *Comanche Warrior Lancing an Osage, at Full Speed* by George Catlin, 1837–39. Smithsonian American Art Museum, gift of Mrs. Joseph Harrison, Jr. *Goat Ripping, Tajikistan* by Louis Lozowick, 1932. Smithsonian American Art Museum, gift of Adele Lozowick.

Color photograph on page 9: *Man Diving* by Raghubir Singh. Arthur M. Sackler Gallery, gift of the artist. Copyright © 1987 Raghubir Singh/Succession, Raghubir Singh.

Wet-plate camera on page 18: Jeff Tinsley, Smithsonian Institution.

You might also be interested in . . .

We encourage you to complement your lesson plan on photography with "Getting the Picture," a special issue of *Ask* children's magazine. "Getting the Picture" was created by the award-winning Cricket Magazine Group in partnership with the Smithsonian Center for Education and Museum Studies. Contents include:

• The stories behind some of the photographs and photographers in the Smithsonian collection, with a focus on how photography changed the way people think about and experience the world.

• An article on Harold "Doc" Edgerton, whose stop-action, strobe photography enabled scientists to see processes that were too fast for the naked eye—athletes in motion, falling milk drops, and bursting balloons—while revealing an amazing and often beautiful world.

• An interview with the staff photographer at the Smithsonian's National Zoo, Jessie Cohen, along with an activity booklet of Jessie's tips for taking great photographs of students' pets or favorite animals.

• And a humorous look at the history of photography, from an early camera obscura to the latest cell-phone camera technology.

You can find out more about using this issue of *Ask* in your classroom, as well as other Cricket/Smithsonian magazines, at **www.smithsonianeducation.org/publications.**

arts & sciences for kids

ask