The History of Photography: An Overview
Alma Davenport; University of New Mexico Press, 1991.

Photography and Its Impact on World Events—An Overview

The technique of photography, or the act of "writing with light" (photo-graphy), has evolved tremendously through the 150-plus years of its existence. Photographs have been used for innumerable and varied purposes. Camera images have recorded the battles of war, a human's first steps on the moon, and Aunt Florence's annual Labor Day picnic. Photographs have been exalted in national art galleries and affixed to refrigerators. They can take the form of infrared imagery by world-famous physicists or snapshots produced by your little brother. Photography, indeed, takes on many guises.

We have been trained in this last century to accept the photograph as a factual object. We normally assume it describes realistic events. Because we see so many of these images (one source estimates that the average American sees over 15,000 camera-generated pictures, daily), we usually accept their information passively. We view them, then disregard them. Consider, for example, newspaper or television advertisements.

What many people do not comprehend is the fact that photography has, since the 1840s,. played a pivotal role in shaping world events. A great number of scientific breakthroughs could not have transpired without the use of cameras. The political structure of the world would be quite different if photography had not been invented. Indeed, the very social fabric of our lives would be altered if light-sensitive film had never been put to use.

Photography as a Scientific Tool

In 1839, photography was announced as a great scientific breakthrough. Prior to that time, all light-writing (photo-graphy) was produced by working with a fleeting, traceable image formed through the use of light and/or mirrors. The apparatus used to create these traceable images was either an immobile camera obscura (literally a darkened room; Figure 1-4), or the more portable camera lucida (Figure 1-7). Both tools were used in conjuction with tracing paper, to achieve proper artistic perspective.

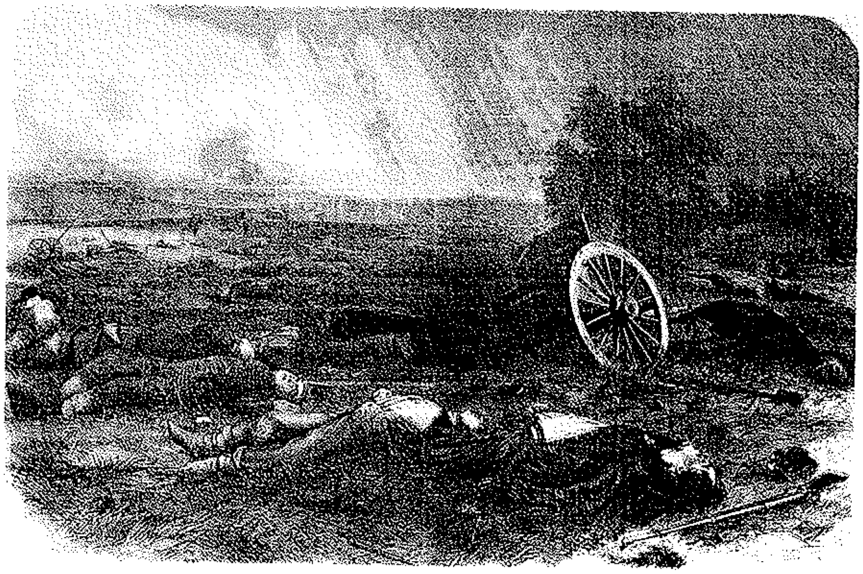
The great *scientific* invention was the ability to create a lasting photographic image on either metal or paper. In both cases, the image was actually formed by light rays (as opposed to being reflected onto paper, then traced) and made stable through the use of chemistry. The inventor of the first metal plate system of photography, Louis Jacques Mandé Daguerre, thought his discovery so revolutionary that he attempted to patent it. However, in a political move, the French government decided to herald the process as an example of national scientific excellence. Government members instigated a meeting of the Academy of Sciences at the Institute of France to announce the discovery. International scientific figures as well as a goodly number of press reporters were invited to witness this great new invention.

After introducing it in their homeland, the French government decided to offer the process, without cost, to *toût le monde* (the entire world). International scientists, inventors, and artists soon initiated work incorporating Daguerre's process. Within a few years, Daguerre's original pamphlet of instructions had been translated into nine languages.

Although the initial process was costly, complex, and time-consuming, over the years it has evolved from the very cumbersome metal plate system to the streamlined systems of the 1990s. Some of the processes of today do not require the photographer to even use traditional film, much less develop negatives and prints. In some cases it is all done automatically.

As science simplified the process of photography, photography also benefited the sciences. For example, in 1940, Dr. Harold Edgerton began work with millisecond flash photography. His resulting images allowed scientists to study the effects of object movement previously only imagined (Figure 12-13).

The discovery of X-rays (beams that penetrate opaque structures) was announced in 1901 as the work of Conrad Roentgen, who received a Nobel Prize for his studies. The X-ray has since become invaluable in assisting medical diagnoses and studies in microbiology. With



I-2
Timothy O'Sullivan
Wood engraving taken from the Civil War photograph,
A Harvest of Death—Gettysburg, July 4, 1863
Printed in *Harper's Weekly*, July 22, 1865
University of Rochester through IMP/GEH

the relatively new process of computerized color X-ray photography, medical afflictions from arthritis to tumor growth can be easily identified.

The science of astronomy has been assisted immeasurably through its alliance with photography. As early as 1877, it became possible to record a complete photographic mapping of a fixed-star firmament. As telescopes (fitted with cameras) became more sophisticated, so did the astonomer's search for information about the heavens. Today, Skylab's machinery routinely emits photographs of our solar system (and beyond) for analysis and study.

Photography as a Political Tool

However, information from the heavens is not always so scientific in its orientation. More frequently, aerial and other types of photography are being used for espionage and political purposes. As such, they have contributed to the continuing *political* evolution of international relations.

During the First World War, in 1916, cameras were used during flights over enemy territories to determine troop movements. After in-flight exposure, the film was flown to headquarters, where it was developed, and the progress of troop lines and armaments were ascertained. This information proved invaluable for strategic purposes. Some experts believe battles, and even wars, were won or lost as a result of photographically generated information.

A more benign example of photography's usefulness during time of war is the tintype. Tintypes are nonreproducable photographs on pieces of tin. Many tintypes were taken of individual soldiers during the Civil War. The subjects stood proudly before a crudely painted backdrop, their uniforms proclaiming their allegiance as Yankee or Rebel (Figure 2-5). These tintypes of soldiers were given as mementos to loved ones. Conversely, many a young lady had her likeness preserved on a tintype and presented it to her beau before he left for the battlefield.

Matthew Brady's Photographic Corp followed these soldiers into the Civil War battle zones. The resultant images were transformed into wood engravings, which were then reproduced in the popular illustrated journals of the day. In reading these papers, people far from the scene of battle got their first look at the effects of armed conflict. Some of these images and engravings were so gruesome that they stoked civilian fervor against the "other side." Thus, more than 100 years ago, photographs were used as a political tool.

John Heartfield's montages of Hitler and Mussolini, produced during the Second World War, politically lampooned these tyrants and their aggressions in Europe and Africa. While these artworks were obviously collaged manipulations, and as such were never regarded as realistic, they served as a powerful political force. Many were published in popular European periodicals, and left no doubt that a faction existed which questioned the motives and actions of a number of rising political figures in Western Europe.

More realistic, unmanipulated photographs were also routinely published in order to rouse public sentiment. During the Second World War, news-oriented photographs were featured in most periodicals of the time. These images glorified the political effort, though they often showed the cost in terms of human misery. In doing so, they underscored and intensified civilian recognition of the horror of war. More recently, during the 1960s, photographs of the Vietnam conflict were published worldwide. There is a general belief that the publication of such emotive images as that of the My Lai massacre prompted the American public to pressure the government into ending its involvement in the conflict.

I-3
John Heartfield
Adolf, the Superman: Swallows Gold and Spouts Junk
1932, photomontage,
rotogravure on newsprint
Museum of Fine Arts,
Houston, Texas

I-4
Ron Haeberle
My Lai Victims
1969, gelatin silver print
©Time Warner, Inc.
Life Magazine

I-5
W. Eugene Smith
Tomoko in Her Bath
1972, gelatin silver print
©Aileen Smith and the heirs of W. Eugene Smith courtesy BLACK STAR

Photography as a Sociological and Emotional Tool

The fact that photographs provide an *emotional* impetus to alter social conditions has long been recognized. For example, engravings from photographs that documented the poor were published as early as 1851.

In that year, Englishman Henry Mayhew pioneered social awareness through photographs with his treatise, "London Labour and London Poor" (Figure 4-2). While this account did little to change the reported conditions, it started a movement in social photography that continues to this day.

Among the first sociological photographs that can actually be attributed to altering world affairs (through emotional content) are those of Lewis W. Hine. Hine started his photographic career by photographing Eastern immigrants entering the United States via Ellis Island in New York. As with Mayhew's work in London, Hine's imagery of Ellis Island did not drastically or immediately alter the conditions faced by his immigrant subjects. However, when Hine followed these immigrants into their tenement homes to photograph their living and working conditions, dramatic events eventually ensued, resulting in better conditions for his subjects, as well as for succeeding generations of the working poor (Chapter 4).

Hine's focus was eventually directed on the children of these new American immigrants. He took many photographs of young people and their abysmal working conditions (Figure 4-3 and Figure 4-4). In 1907, he was appointed as a reporter for the National Child Labor Committee. By 1916, he had accumulated enough photographic work to publish an exposé of the children and their working conditions. The report, as it centered around children, triggered an enormous emotional response. The furor it instigated prompted pressure on the United States Congress. Popular demand dictated immediate action to redress these intolerable conditions. The ultimate result was the formation of what we now know as the Child Labor Laws, which are directly designed to protect future generations of youth from such abuses.

From 1971 to 1975, W. Eugene Smith worked on a series of emotive environmental photographs when he exposed the consequences of industrial pollution in Minamata, Japan. Certainly, the emotional reaction to the physical suffering he recorded awakened his audience to the importance of enacting legislation to govern toxic waste.

Of course, not all photographs are imbued with this sense of history or emotional drama. Some imagery, notably landscapes taken during the mid–1870s by William Henry Jackson, were less emotional in their appeal. However, the power of his imagery (as well as that of lesser known photographers of the American West) prompted the United States Congress to enact legislation that created the National Parks System.

W. H. Jackson was originally employed as a photographer for a geological survey team exploring the uncharted lands west of the Mississippi River. Within a few years, they had pressed west far enough to reach, and to photograph, the Grand Canyon and the Yellowstone River. The resultant landscape images were shown to the American public (who were naturally eager to study the "Wild West"). Their reaction was so universally strong that soon members of the U.S. Congress were involved. Both funding for civilian expeditions and the creation of a national parklands system (starting with Yellowstone National Park) were a direct result of W. H. Jackson's photographic work (Figure 5-6).

Conclusion

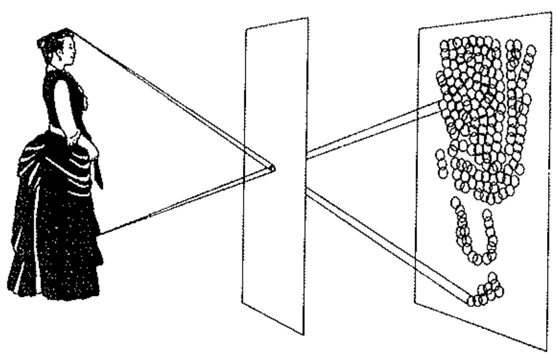
Of course, many millions of photographs have been taken in the last 150 years. Why does history remember some and not others? Three elements distinguish photographs as visual–historical documents: composition or aesthetic value, a statement or a message, and historical or topical context. Of course, because this book focuses on the history of photography, time placement is all important. Also, because photography is a visual medium, aesthetics and composition are very important considerations. The statement or message, while assisted by composition, must also be forceful enough to communicate the idea behind the photograph.

In this text, the reader will see photographs as simple as flowers in vases. Such images cannot be evaluated on the basis of their scientific, political, or sociological merits. However, these images *do* reflect, in some way, the attitude and the prevailing notions of art and aesthetics at the time in which they were created. They are well–composed images that evoke the mood of a society; thus, it is important to include them in historical and artistic contexts.

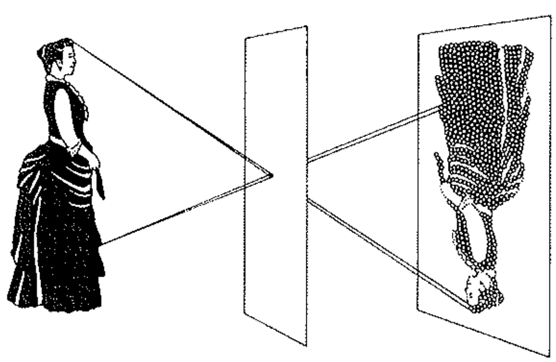
Certainly, not all photographs *alter* world events. However, as discussed throughout this text, photographs have the ability to *shape* our scientific, political, and emotional worlds.

It was in China during the fifth century B.C. that a man named Mo Ti recorded his observation of light rays and their ability to project a "duplicate" image. He noticed that when light reflected off an object, and that reflection passed through a pinhole onto a dark surface, an inverted image of the object was evident on the darker surface. The light was "writing" a description of the object. Thus begins the story of photo-graphy, which translates from Greek to "writing" (graphos) with "light" (phot-).

Because we do not know the circumstances that surrounded Mo Ti's discovery, we can only guess that the image he saw projected was bright, but inexact—more like a fuzzy sketch than a perfect rendering—because the diameter of the pinhole that the light passed through was probably rather large (Figure 1-2). It was not until the tenth century that an Arabian, Ibn Al-Haitham (Alhazen), repeated this visual experiment and realized that by reducing the diameter of the pinhole, a fainter, though more precise, reflected image resulted (Figure 1-3).



1-2
An example of the first photo-graphic discovery. When light reflects off an object and passes through a pinhole, it creates an image of the original object. When the pinhole is large, the reflected light rays have the opportunity to spread, and are received on a flat surface as large circles. These "circles of confusion" run into each other, and create an unclear image.



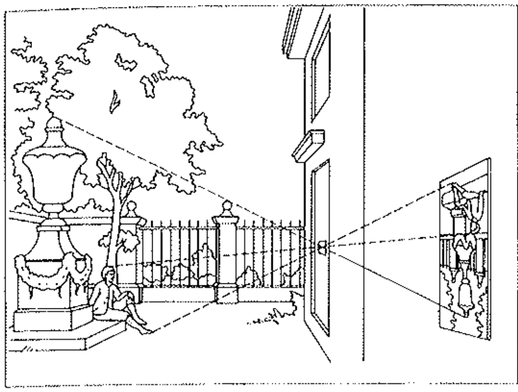
1-3
When the size of the pinhole is reduced, the amount of light reaching the flat surface is reduced and, therefore, spreads less than if the pinhole were larger. The resulting image is visually soft, but readable.

The Camera Obscura

Centuries later, this principle of photography (light writing) was further refined through the use of the *camera obscura* (dark room). These darkened rooms were used by people who wanted to view and record exterior scenes from an interior vantage point. By using this system, studies could be made of the heavens, the passage of the seasons could be recorded, and architectural studies could be made. In the 1560s, an Italian, Danielo Barbaro, noted that a lens could be substituted for a pinhole, resulting in a further sharpening and brightening of the image. Revisions of the original camera obscura concept continued into the late seventeenth century, when interested individuals constructed cumbersome tentlike rooms in order to increase the camera obscura's portability.

By the seventeenth century, the camera obscura had become a familiar tool for artists, draftsmen, and scientists. Philosophers were describing the images produced through use of the camera obscura as a perfect duplicate of life itself. In retrospect, the proclaimed perfection of images rendered through use of the camera obscura was somewhat premature. For example, although artists used it for renderings, the perspective angles that resulted were not accurate because of the simplicity of the lens. Further, the camera obscura was rather inconvenient to use. It required an interior area large enough for an adult to stand erect without obscuring the image cast on the far wall. Because of this space requirement, even the tent types were normally too cumbersome for spontaneous use.

The two problems of portability and image accuracy were resolved in the 1700s. First, the problem of mobility was overcome by minimizing



1-4
An example of a 15th century immobile camera obscura. By the 1700s, refinements allowed artists to carry this photo–graphic device into the field to obtain clear reflected images for artistic rendering.

the required space. The camera obscura was reduced from a fixed room to a small closet, and finally to a 24–inch rectangular box (Figure 1-5) that could be easily carried into the field to produce any type of artistic or scientific rendering. This box was fitted with a simple magnifying–type lens at one end and a sheet of frosted glass at the other end. The view to be reproduced would pass through the lens and be reflected on the ground glass. The artist or scientist would place a piece of translucent paper on the ground glass, and simply trace the reflected image.

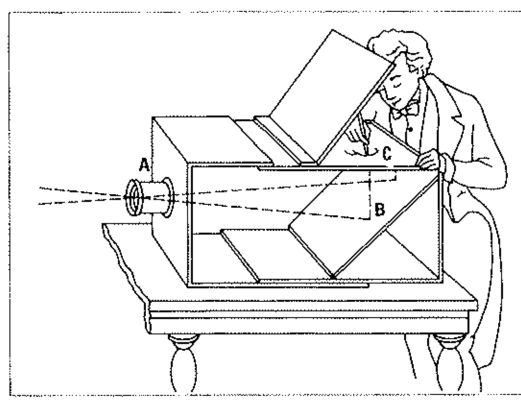
The second problem, that of representational accuracy, was also resolved in the 1700s. Prior to that time, the image cast by the lens was not an accurate depiction of the scene. The simple, single–element lenses that were used produced convex, dish–shaped images. When these were received on the flat surface of the ground glass they reflected distortions of the subject. As the painters and scientists of that time insisted on perfect perspective representations, it was obvious that a more sophisticated lens system was required. Although there is no exact date for the invention of a flat field lens, or one that minimized distortions, it must have occurred between 1735 and 1768, the years in which Giovanni Canaletto produced most of his paintings.

It is well documented that Canaletto made extensive use of the camera obscura. His early work evidences distortion from the use of a single–element lens. His later work has been described as "the sacrificing of pictoral freedom to greater precision."[2] It is probable that this enhanced reality was due to the introduction of a more sophisticated lens system in his camera obscura.

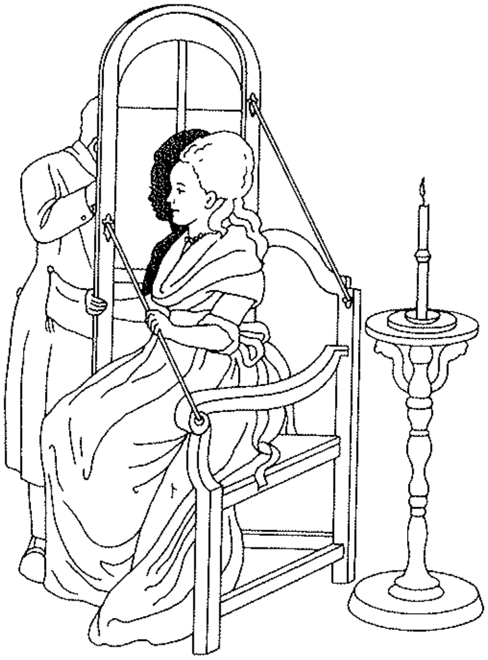
Alternatives to the Camera Obscura

Canaletto was a trained artist, whereas most of the populace who wished to fabricate images through the use of light were amateurs. As the camera obscura necessitated a bit of technical expertise, alternate methods were explored so that photo–graphy could be used with little or no training required. Toward that end, silhouette machines were developed and were in use by the 1780s (Figure 1-6). An object or sitter would be positioned between a bright candle (or other light source) and the silhouette–maker. The object's shadow would fall on a piece of paper held in an easel. The silhouette maker would then cut around the edges of the cast shadow, which resulted in an image that was usually quite true to life.

Silhouettes were primarily used for portraiture, as was another system for rendering human likenesses—the physionotrace. Again, the sitter's profile was "traced," although this method used copper plates rather than paper. These plates were then engraved, which allowed for duplication of the portrait—a feature that was unavailable through the cut–paper method (Figure 1-10).



1-5
A portable camera obscura. Light reflecting off an object is gathered by the lens (A), reflected by the mirror (B), and cast onto the ground glass (C).



1-6
A silhouette-making apparatus.

Another refinement of the original camera obscura concept occurred in 1807, when William Hyde Wollaston constructed the *camera lucida*. Wollaston named his invention well, as *lucida* is derived from the Latin word *lucere*, which means to shine (light). The camera lucida was a simple, portable apparatus (Figure 1-7). Light reflected off a subject and shone through a prism anchored to a metal rod. This rod was attached to a board on which drawing paper was laid. Through the use of a peephole adjacent to the prism, the subject and the paper could be viewed simultaneously. The "artist" simply transcribed on paper the view seen through the prism.

Although the camera lucida made renderings a bit easier than the camera obscura, its chief advantage was portability. During the first half of the 1800s, an ever-increasing international curiosity was developing. Privately and publicly funded expeditions, led by artists and scientists, ventured to the Near East and beyond. Camera lucidas and small camera obscuras became as indispensable as notebooks, allowing voyagers to complete visual diaries as well as written ones.

Use of tools such as the camera obscura, camera lucida, the physionotrace, and silhouettes should certainly be considered photo-graphy, as reflected *light* was used to *write* (or draw). However, up to this time, a person was the instrument who physically created and finished the rendering. *Light* was not creating the permanent record. The age of photography (as opposed to photo-graphy) had not yet begun, for there was no method or substance yet discovered that could collect light and etch the reflection permanently onto an object.

Arresting a Purely Photographic Image

Although experiments with chemical substances such as silver nitrate, which reacted to light rather than heat, were performed throughout most of the eighteenth century, it was not until just prior to 1800 that man was first able to use light to describe an object. Thomas Wedgwood, son of the famous British potter, was commissioned by Catherine the Great of Russia to provide a china table service decorated with more than 1,000 views of country homes and gardens. First, the sites were meticulously drawn using the camera obscura. Then, since Wedgwood was familiar with the recent experiments using silver salts, he attempted to transcribe the sketches onto various surfaces using nitrates and light. He did, in fact, produce an image that was a direct result of the sun's rays. He describes the surface in this way: "...on being exposed to day light, it speedily changes color, and, after passing through different shades of greys and brown, becomes at length nearly black."[1] Unfortunately, these "sun prints" were not permanent, as the unexposed silver salts were unstable. Further illumination required for viewing the print, unless very dim, quickly exposed the unstable silver salts and permanently obliterated the entire image.

Joseph Nicéphore Niépce

In 1827, Joseph Nicéphore Niépce, a Frenchman, was the first to stabilize the camera's image. He did this by coating a metal plate with bitumen of Judea, then placing the coated plate in a camera obscura. He pointed the camera out a window and waited several hours for the exposure to materialize. After removing the plate from the camera, he immersed it in an oil solvent. The oil removed the bitumen that had not been struck by light. It left a lasting image.

Niépce had, thus, successfully exposed, developed, and fixed an image that was directly formed by light. He called his discovery "heliography," after "helios," which is Greek for sun, and "graphos," for writing.

The discoveries of Niépce were tremendously important to the evolution of photography, but they had two fatal flaws. The first was the low sensitivity of the bitumen emulsion he was using. Exposures in a camera obscura could take as long as three days. His most familiar image (and one which is generally regarded as the "first photograph") took eight hours to expose in bright daylight (Figure 1-1). Because the sun naturally shifted positions during the exposure, all shadow delineation was lost and the image was difficult to comprehend visually. The second problem was his method of applying the bitumen emulsion. Niépce used a dabber, similar to a large cotton swab, which resulted in an uneven coating of emulsion. Because the emulsion was not applied smoothly, the resultant image was blotchy in appearance.

Niépce realized he was involved with a great discovery. However, even though he retired from all other work (which was not a particular hardship as he was rather wealthy) and hired his son, Isidore, to work with him, he could not overcome the difficulties of long exposures and uneven results. He was beginning to despair and to think that his invention could be used only for minimal engraving purposes, when he received a letter of inquiry from a fellow Frenchman, Louis Jacques Mandé Daguerre.

Niépce and Daguerre—A Collaboration

Daguerre had heard of Niépce's experiments from a mutual acquaintance, Chevalier—a Parisian lensmaker. The lensmaker had advised Daguerre that a fellow countryman had ordered camera obscuras for experiments very similar to those Daguerre was attempting. Natural curiosity prompted Daguerre to contact Niépce and a correspondence was initiated. Within a year, Niépce visited Daguerre in Paris, where they discussed their mutual interests. Two years later, in 1829, they signed a ten-year partnership agreement.

Only four years of their agreement had elapsed when Niépce died. Although Daguerre urged Isidore to continue experiments in his father's name, Isidore refused, suspecting that Daguerre would ultimately steal the invention.

1-7
The portable camera lucida. This photographic device used a prism to cast a visually accurate image onto tracing paper. The convenience and portability of a camera lucida allowed artists to record foreign subject matter throughout their extensive travels.

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It is debatable whether Isidore was correct in his suspicions of Daguerre. It is known that after the death of Niépce, Daguerre offered Isidore a new contract that stated clearly that he (Daguerre) was to be considered the sole inventor and would only transfer the partnership if "this new process shall bear the name of Daguerre alone."[4] Further, it was stated that Niépce's process could be published simultaneously, but not with the same content. Also, when the French government offered an outright award for the rights to the process, Daguerre received 6,000 francs, while Isidore was awarded only 4,000.

Isidore signed the contract reluctantly and completely discontinued working on his father's portion of the invention. Meanwhile, Daguerre was proceeding feverishly in Paris, preparing a pamphlet describing the process. He envisioned his process would be sold by subscription to interested, primarily wealthy, individuals. The French government caught wind of this private enterprise and persuaded Daguerre to accept the award of 6,000 francs in order that the government could offer the process, free, to the entire world. That is, free to all the world save England. Daguerre, knowing international law, scurried hastily to England, where he received patents and, eventually, royalties on his discoveries.

The Daguerreotype—A Startling Invention

It was at the Academy of Sciences in 1839 that Daguerre gave his first demonstration of his process. The workings were complex. They required a copper sheet to be plated with silver and then exposed to iodine vapors, which produced the light-sensitive emulsion, silver iodide. The plate was exposed in a portable camera obscura, then "developed" by exposure to mercury vapors, and finally "fixed" in a bath of hyposulfite of soda. It is true that his process varied considerably from that of Niépce in the chemistry used, the shorter exposure time necessary, and the resultant crispness of the image.

After the demonstration, Daguerre's name was immediately on the lips of people around the world. Reports issued from the halls of the Academy of Science immediately following the demonstration. The reactions were universal: "great discovery!;" "extraordinary result!;" "this is Nature itself!"

William Henry Fox Talbot—The Calotype

The news of Daguerre's invention startled the world and astonished perhaps no one more than British scholar William Henry Fox Talbot. Unaware of Daguerre's discoveries, Talbot had also been working on a process that would permanently arrest the image of light on paper. In 1833, (six years before Daguerre's demonstration), Talbot had conceived a method of making permanent photographic images. Within 2 years, he had devised a light-sensitive emulsion by making alternate coatings of sodium chloride and silver nitrate on paper. These chemicals reacted with each other to form silver chloride, a light-sensitive material. Talbot placed simple natural objects in contact with this sensitized printing paper, then exposed it to the sun. Where the paper was not protected by the opacity of the object, the emulsion would darken, rendering a white silhouette against the dark background.

The accuracy of his results were startling. As Talbot wrote, "Upon one occasion, having made an image of a piece of lace of an elaborate pattern, I showed it to some persons at the distance of a few feet when the reply was, 'That they were not to be so easily deceived, for that it was evidently no picture, but the piece of lace itself."[5] Today, these images would be called contact prints, as the negative or object had been placed in direct contact with the paper's emulsion. Talbot, however, referred to them as "photogenic drawings." They were somewhat different than a camera obscura's image, as the latter was formed through reflected light rays, not those that had been blocked by an object resting on a light-sensitive surface.

Talbot's photogenic drawings were a derivation of Thomas Wedgwood's earlier experiments conducted while attempting to decorate the china service for Catherine the Great. Talbot knew of Wedgwood's work with silver salts and he felt as though he had significantly improved on Wedgwood's theories. Talbot had, by 1835, improved the photographic paper's sensitivity (through a faster emulsion) and had succeeded in "fixing" the image through the use of either potassium iodide or salt.

Talbot continued to improve his basic process through the mid-1830s. As his first trials rendered only the highlighted portions of the objects he wished to record, he decided that the problem lay in the size of the camera obscura and the lens he was using. The camera was too large, thus diminishing the amount of light that reached the sensitized paper at the end opposite the lens. To correct this problem, Talbot began to collect small boxes and convert them into cameras—"little mouse traps," his wife called them—to photograph his home, Lacock Abbey. His first successful image, in 1835, produced a one-inch square paper negative of a latticed window, which he claimed, "might be supposed to be the work of some Lilliputian artist."[6]

Negatives and Positives—Calotypes Versus Daguerreotypes

Talbot had been working on his photogenic drawing process for more than five years when he heard of Daguerre's presentation to the French Academy of Sciences on January 7, 1839. Prior to this news, Talbot had been working on a variety of projects, not all of them photographic. He had partially succeeded in expanding from the "contact print" photogenic drawing process to using lens and paper in his "little mousetraps." However, when Daguerre's proclamation was publicized, he realized he had no time to lose. He rushed samples of his drawings to the British Royal Society, after which he corresponded with various academicians, stating that he would claim priority in the method of "fixing the images of the camera obscura and the subsequent preservation of the image so they would bear full sunlight (Figure 1-9)."[7] On January 31, scarcely three weeks after Daguerre had made his presentation in France, Talbot's paper, "Some Account of the Art of Photogenic Drawing—The Process by Which Natural Objects May Be Made to Delineate Themselves Without the Aid of the Artist's Pencil" was presented to the the British Royal Society.

1-9
William Henry Fox Talbot
Hydrangia
1840, photogenic drawing negative on
a salt paper print
Lacock Abbey Collection,
Fox Talbot Museum

1-10
Gilles–Louis Chretien
Portrait of Mme. Roland
ca. 1793, physionotrace engraving
Museum of Art, RISD

1-11
Hippolyte Bayard
Self Portrait as a Drowned Man
1840, direct paper positive
Société Française de Photographie

It is interesting to note that there existed such a strong competetive feeling between the two men, especially as the processes they had developed individually were quite dissimilar. The photogenic drawing process was a "contact printing" method of making light-generated imagery. Even after Talbot succeeded in making images with a camera (which he originally dubbed Talbotypes, later called calotypes), his methodology was very different from that of Daguerre. The light-sensitive chemistry involved was different. Daguerreotypes produced images on metal. Calotypes were produced on paper. Daguerreotypes were very fragile and had to be encased in glass for the image to survive repeated handlings. Calotypes were relatively durable. Perhaps the most important difference was that daguerreotypes produced unique positive images, while calotypes used a negative system capable of producing endless duplicates. However, as different as their processes appeared, it was the *idea* of permanent, light-generated imagery that seemed to be the crux of the competition.

Hippolyte Bayard—A Losing Latecomer

Other inventors were working at this type of light-sensitive system independently of both Daguerre and Talbot. Because of the circumstances (and politics) involved, they received only a hint of recognition. Hippolyte Bayard, a Frenchman of modest means, had been working with light and emulsions since 1837. His first results were negatives produced on silver chloride paper. Like Talbot, he was stunned to hear of Daguerre's process and within months of Daguerre's pronouncement, had succeeded in producing direct positive imagery on paper. Upon showing these results to Daguerre's "mentor" in the French government, François Arago, he was given a token payment to continue experimentation. In retrospect, the meager sum Bayard was awarded smacked of "hush money," as Arago counseled Bayard to remain quiet about his discoveries.

As could be expected, when the public heard of Daguerre's invention, it superceded all others, leaving Bayard as a shadow—or as he would have it, a half-drowned corpse. Bitter at the treatment he had received, he used his process to make a self-portrait (Figure 1-11). On the back of the print he wrote, "The body you see here is that of Monsieur Bayard...The Academy, the King, and all who have seen his pictures admired them, just as you do. Admiration brought him prestige, but not a sou. The government, which gave M. Daguerre so much, said it could do nothing for M. Bayard at all, and the wretch drowned himself."[8]

Sir John Herschel's Early Contributions

Sir John F.W. Herschel, noted astronomer and scientist, was also working with the camera obscura and light-sensitive materials. Although he received satisfactory results, his most important discovery was the method of "arresting the further action" of light—or "fixing" the image. Herschel had noted, in 1819, that hyposulfite of soda dissolved unstable silver salts. When he used this discovery in a photographic context, he found that he could use hyposulfite of soda to retain images he had made. Talbot learned of Herschel's discovery and, with his permission, described it in a letter published to the French Academy of Sciences. Daguerre, being French, also heard of the process, and was quick to adopt the use of "hypo" as well. To this day, the retention of almost all photographic images relies on Herschel's discovery.

Sir John Herschel also left another very important contribution to the history of the medium. He was an amateur linguist and noted that the verbiage used by Daguerre and Talbot was somewhat awkward. For example, Talbot used "reversed copy" and "re-reversed copy" to describe his results. Herschel, hearing this, suggested substituting the words "negative" and "positive," respectively. Herschel also suggested using the word PHOTOGRAPHY to describe the entire light-writing process. That terminology seemed to best describe the results of all experimenters who were beginning to depict the world through the action of the sun on light-sensitive materials.

Innumerable improvements have been made to the original photographic process in the past 150-plus years. Exposure times have been shortened dramatically. The application of emulsions has been standardized. The machinery has been streamlined. However sophisticated the process has become, its roots lie in the contributions of many light-writing pioneers—especially Louis Jacques Mandé Daguerre and William Henry Fox Talbot.

We are...wondering over the photograph as a charming novelty; but before another generation has passed away, it will be recognized that a new epoch in the history of human progress dates from the time when He who—never but in uncreated light Dwelt from eternity—took a pencil of fire from the hand of the "angel standing in the sun," and placed it in the hands of a mortal.[9]

—Oliver Wendell Holmes