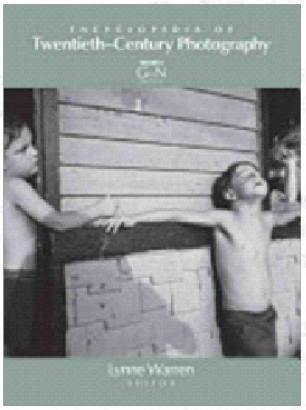

HISTORY OF PHOTOGRAPHY: NINETEENTH-CENTURY FOUNDATIONS

To fully understand the twentieth-century history of photography, it is necessary to return to photography's beginnings, to the contextual environment of its "invention" in France and England and to important precedents. Although historians document through texts as early as the fifth century BC the phenomenon of light projected through a small opening (aperture), creating variable patterns on a surface, photography's "pre-history" really began in the Renaissance with two basic photographic concepts: the ideas of the "frame" and of the "box."

The "frame" is an important editing device allowing two-dimensional representation of three-dimensional space (a drawing, a painting, later a photograph) and depends largely on principles of linear perspective developed in 1435 by the Italian painter Leone Alberti in *On Painting*. The "box" combines the light source, aperture, and surface into one entity, the "camera obscura." This Renaissance drawing device conceived by Leonardo da Vinci (about 1500) and described by Giovanni della Porta in Natural Magic (1553), is literally a "dark room" with one wall (opposite a tiny opening) becoming the vertical section of a cone of light: the frame (called "Alberti's window"). The camera obscura improved through time becoming smaller and more portable; optics were added (the idea attributed to Daniello Barbaro in 1568), and mirrors to "right the image."

Thus, a cumulative effort of many centuries of ideas and innovations allowed the inventors of photography, Joseph-Nicéphore Niépce, Louis

Daguerre, William Henry Fox Talbot, and Hippolyte Bayard to draw on this "pre-history," to add to the mix through trial and error, the latest nineteenth-century chemistry and achieve what historians refer to as the "historical moment"—a permanent image taken by a camera (camera obscura). At least four such "moments" declared the invention of photography. The first photograph, amazingly still extant, was by Joseph-Nicéphore Niépce taken from a window on his estate at "Le Gras," near Chalon-sur-Saone, in France, dated 1827. The emulsion (bitumen of Judea familiar to graphic artists) was coated onto a pewter plate and the camera exposure lasted about eight hours, as evident from the recorded shadows. It was a photograph (heliograph); but it was not a viable process. That would come later with the achievements of Niépce's partner, Louis Daguerre, a commercial artist of some renown. Unfortunately, Niépce died before Daguerre discovered, probably by accident, the key to his positive process: mercury vapor as a developing agent. The historic announcement of the invention of the daguerreotype (a copper/silver plate) was made in January 1839, and was greatly facilitated by Franqois Arago of the Chamber of Deputies who convinced the French government to purchase the patent and provide Daguerre a substantial annuity of 6,000 francs.

Daguerre's announcement gave rise to another historical moment across the Channel from France, where the distinguished English scientist, William Henry Fox Talbot, hurriedly gathered his photographs, many exposed in tiny cameras, and his experimental evidence of a very different negative/positive paper process, the Talbotype, and announced before the Royal Society the invention of photography ("Photogenic Drawing") in England, also in 1839.

While nationalistic politics fed the declarations of invention in France and England, still another inventor, an unsung hero, waited at the request of the French government to announce what was, in a strange way, a combination of both processes. Hippolyte Bayard invented a positive paper process of photography, more like Talbot's than Daguerre's, perhaps with more significance to art history, since he immediately exhibited some of the most aesthetically interesting images of the time. Along with architecture and genre subjects, Bayard's enigmatic self portraits, including *Self-Portrait as a Drowned Man (1840)*, an allusion to David's *Death of Marat*, borrowed on satire to reproach the French government for his lack of recognition. These photographs helped establish France as a center of photographic art and provided a home for Talbot's English paper process, the Talbotype or calotype, for even Bayard switched to the more sophisticated calotype.

Prior to the dissemination of the daguerreotype process, with its greatest expansion in the United States (9,000 instruction manuals and considerable equipment sold in 1839), and the calotype process, with its greatest achievements in France, there was another development in Scotland, in the early body of photographs produced by Hill and Adamson. Although the French had declared the daguerreotype patent-free except in rival England, Talbot maintained his expensive patent on the calotype, delaying its expansion in his own country. He offered it patent-free, however, to his friend, Sir David Brewster, in Scotland, where eventually it was given to the artistic team of David Octavius Hill and Robert Adamson, a partnership that produced over 2,500 calotypes, mostly portraits, allegories, and tableaux beginning in 1843. This perhaps overshadowed Talbot's own considerable contribution of photographs printed in his book *Pencil of Nature* (1844), calotypes of architecture and genre scenes, many taken at his estate at Lacock Abbey. Photography's "historical moment" in England was best represented in about four-and-a-half short years by an extensive portfolio of photographic art in Scotland, a great start for the medium.

Despite this achievement, the calotype flourished better in France and has been characterized as a collective aesthetic occurring between 1845 and 1870 according to Andre Jammes and Eugenia Janis in *The Art of French Calotype* (1983). Unlike the daguerreotype, used primarily in the commercial portrait studio, the paper calotype lent itself to a long tradition of print-making and drawing, and was an efficient reproducible art (numerous prints from one negative). The "lack of aura" attributed to one-of-a-kind art, would later challenge photography's legitimacy in the twentieth century according to Walter Benjamin in *The Work of Art in the Age of Mechanical Reproduction*. Furthermore, since the calotype looked like art (it was championed by Lady Eastlake, an early writer on photography), it was easy for critics and intellectuals to include the calotype with more established arts in a never-ending desire to have photography imitate painting and hold its own as "high art." Hippolyte Bayard's positive paper prints hung next to works by Titian and Rembrandt, in the Martinique benefit exhibition, in Paris, in 1839—possibly the very first photography exhibition.

The early French calotypists, Hippolyte Bayard, Louis Blanquard-Evrard, and Gustave Le Gray experimented with and improved the aesthetic potential and longevity of the medium, by improving the tonal range, the richness of blacks, the vari-

ety of papers, and waxing the negative. The waxing process developed to improve emulsion absorption was attributed to Le Gray, a photographer and teacher with his own art school. The production of lasting portfolios to preserve the delicate calotypes and facilitate their distribution was attributed mostly to Blanquard-Evrard. The photo critic, Francis Wey, stated, "Our albums are our salons."

The nationalistic fervor of the Second Empire prompted Napoleon III to modernize Paris, following the French Revolution (1789–1793), and to attempt to restore the glory of French architecture. For the first time, photographic documentation played a role in restoration, as did the influence of Romanticism on all literary and visual output. Romanticism influenced the use of the calotype over the daguerreotype to document the great medieval cathedrals across France, despite the detail, sharpness, and tonal range that could be achieved with the daguerreotype; ironically, it was considered of too small a scale and too impersonal ("cold tinge, shiny surface"). Government grants for photographic restoration, the "Missions Heliographiques" (1851) were provided to the early calotype artists: Hippolyte Bayard, Henri Le Secq, Edward Baldus, Gustave Le Gray, and O. Mestral. Charles Négre, calotypist and student of Le Gray, later explained this romantic viewpoint:

> Being a painter myself....whenever I could dispense with architectural precision, I indulged in the picturesque, in which case I sacrificed a few details when necessary, in favor of an imposing effect that would give a monument its real character and also preserve the poetic charm that surrounds it.
>
> (Jammes 1983, 62)

If the project failed as architectural documentation—even the ongoing lithographic survey, "Voyages Pittoresques," provided more details than the calotype photographs—it gave these fine calotype photographers recognition and respectability, as Daguerre had had with government support.

The calotype was also used for documentation in Egypt, the Holy Land, and other locations. Maxime du Camp, accompanied by writer Gustave Flaubert, made calotypes as early as 1850 on an expedition to Egypt; Charles Marville documented Paris prior to Eugène Atget, and photographed in Germany in 1853; and Edward Baldus, using both the calotype and the wet-plate process, documented cathedrals, early railroads, and the devastating Rhône floods of 1856.

While members of the science community seized on the new wet-plate collodion attributed to Frederick Scott Archer, in 1851, advocates in the art community fought furiously for the retention of the calotype. The art journals of this period, *La Lumiére*, for the *Société Haliographique* and *The Bulletin* for the *Société, Française* favored the calotype, while *Le Propagateur* and *Cosmos* came out in favor of the collodion. The new technology triumphed and in 1851 the collodion era emerged.

Collodion, initially developed for medical use, had the properties for even suspension of silver producing a superior glass negative especially when printed on albumen paper. Therefore, collodion/albumen became the standard used for over 30 years. Unfortunately the glass negatives had to be exposed and processed while moist, requiring a portable darkroom in the field. Although faster, the collodion process was still incapable of recording action.

Louis Daguerre's process had an immediate universal appeal, especially in the United States. In 1839, Samuel Morse, painter and inventor of the Morse code, purchased a daguerreotype system. Experimenting with John Draper, New York University chemistry professor, the two initiated a period in the United States that became the longest, most advanced, and lucrative commercial practice of daguerreotypy in the world. Other innovators, Henry Fitz and John Plumbe working in Boston, Robert Cornelius and the Langenheim brothers in Philadelphia, and others, offered services such as toning, coloring, size options, and elegant frames. They applied steam power and the new German system of labor (assembly line) to their mini-factories and competed to reduce prices. Two of the finest establishments to evolve out of this experimental period in the United States were Southworth and Hawes in Boston, who learned from Daguerre's representative in the U.S., François Gouraud, and Mathew Brady in New York City and later Washington, D.C., who studied under Morse and Draper.

Southworth and Hawes represent the highest quality of skill and variety of daguerreotypy ever produced, rivaled only by Mathew Brady in the United States and, possibly, by Antoine Claudet and Richard Beard in England, and Jean-Sabatier-Blot in France. Beard patented a coloring process that made daguerreotypes as precious as the hand-painted, ivory miniatures they replaced. Brady, prior to his reputation as American Civil War photographer, began by making jewelry cases, learned the daguerreotype, and opened his first of several studios on lower Broadway, New York City, in 1844, across from the famous P. T. Barnum American Museum. He realized that photographing the famous was a means to success. Brady's most important early daguerreotype edition, *The Gallery of Illustrious Americans*, featured prominent Americans

such as naturalist John James Audubon, politician Henry Clay, and others. This edition of daguerreotypes, one-of-a-kind positives, were reproduced as lithographs by the famous lithographer, François d'Avignon. And this shrewd venture helped build his reputation as "Brady of Broadway."

Brady also photographed renowned actress Jenny Lind, performing for P. T. Barnum and the celebrated wedding of another Barnum star attraction, the midget, Tom Thumb, held at New York's Grace Church. Brady established his last and most luxurious studio, the National Portrait Gallery, across from this church where he continued making celebrity portraitures including Edward, Prince of Wales, and presidential candidate, Abraham Lincoln, who said: "Brady and the Cooper Institution [where he delivered a speech] made me president." Photographs taken by Brady personally are few due to eye problems. He had to rely on his brilliant operators, Alexander Gardner, who managed Brady's Washington, D.C. studio, Timothy O'Sullivan, George Barnard, and others whose work was produced under the Brady name, a practice that continued during the Civil War. Gardner and O'Sullivan finally broke with Brady to produce portfolios of the war under their own names: "Gardner's Photographic Sketchbook of the War," (which included work by O'Sullivan) and Barnard's "Photographic Views of Sherman's Campaigns."

War photography was introduced with the advent of the wet-plate process, subsequently replacing illustrators and sketch artists in the field with photographers and their portable dark rooms. Alexander Gardner, specializing in photographs of Lincoln, documented the "Hanging of the Lincoln Conspirators," shortly after the assassination. As one of the first "photojournalistic events" it was too ghastly for the public, and illustrations, but not the actual photographs, were published to record the event.

Known for the first photographs of war in the Crimea, in 1855, pre-dating Brady by some six years, Roger Fenton, the English photographer, holds a special place in the nineteenth century. His career spanned an important middle period connecting the invention of Talbot's calotype, the advent of collodion, the commercial "view" business, and finally war photography. In spite of his reluctance to regard photography as high art, Fenton preceded and laid the foundation for the return of art photography in England during first, the Pre-Raphaelite period, and second, the Pictorialist period.

Fenton had visited France in the 1840s. He was very impressed by salon life, befriended the calotype artists, and had studied painting with Paul Delaroche. In 1847, he joined the English Calotype Club, which had only 12 members due to Talbot's restrictive patent. He founded the Photographic Society of London, in 1853, which later became the Royal Photographic Society and, even established a darkroom in Windsor Castle for Prince Albert. Both Queen Victoria and Prince Albert were strong advocates of photography.

The Crimean War forced Fenton to perfect his new collodion skills under horrible conditions. Sent to Balaklava Harbor at the request of Agnew's Publishing of Manchester, England, and Prince Albert, he recorded the chaos of war and the aftermath of battle, which prompted John Szarkowski, in *Photography Until Now*, to refer to photographs of the terrain as "bare, moon-like landscapes." Fenton photographed for only four months, producing 360 plates, mostly portraits of officers. In 1855, he contracted cholera and was replaced by James Robertson and Felice Beato.

In some ways, the Crimean and American Civil Wars marked the ends of two remarkable careers in photography. Mathew Brady's very nineteenth-century mission and destiny nearly destroyed him; first, when he was almost killed during the battle of Bull Run, and later, when his venture ended in bankruptcy. There was little interest in buying his photographs after the war although, eventually, some 7,000 plates were purchased at discount by the United States Library of Congress. Roger Fenton, having recovered from war and cholera worked for the British Museum and made camera "views," then with little explanation, abruptly ended his photographic career in 1862. Fenton's "views" were some of the best of the genre. His closest competition, Francis Frith and Company, lasted an amazing 111 years. The view business prospered during the wet-plate era with such companies as Francis Frith in England, George Washington Wilson in Scotland, the Alinari Brothers in Italy, Adolphe Braun in France, Bonfils of Beirut, and others, providing eclectic, romanticized, often trivialized documentation of people, places, and events that, nonetheless, are important to the historic photographic record.

The collodion process provided studios with other commercial offerings to augment the portrait and view business. The tintype (Ferrotype, 1856), a collodion positive image on metal, was a cheaper yet far inferior version of the gradually disappearing daguerreotype; the Ambrotype (1854), a collodion positive image on glass, attributed to the American James Ambrose Cutting; and the stereograph (1849) attributed to Sir David Brewster of Scotland, made with a stereoscopic camera such as the Dancer, the Quinet, and the Disderi offered, with the aid of a stereoscope, the phenomenon of three-dimensional

views. The "carte de visite" (1857) attributed to A.A. Disderi in France offered inexpensive multiple portraits, an idea quickly copied by all the large portrait studios, including Brady's of New York. Such innovations greatly expanded photography's commercial possibilities, and, except for the Ambrotype, were extremely popular, some into the twentieth century.

The best studios, such as Mathew Brady in the United States and A.A. Disderi and Etienne Carjat in France survived through fierce competition to prosper in the late nineteenth century. They produced some of the finest portrait work as well as a sensitive record of each country's political and artistic leaders. Another Frenchman, Gaspard Félix Tournachon, or Nadar, was the first in France to photograph from a balloon and to photograph underground with artificial lights, but more importantly, to expand and transform his satirical political cartoons (the Panth, on Nadar) into a highly successful and unique portrait business. His singular style with simple lighting and an emphasis on character when applied to photographing celebrities, created a model for many portraitists and fashion photographers in the twentieth century.

Roger Fenton, who spent a lifetime as an advocate for photography left this pursuit at a time when art photography suddenly reemerged among the elite in English society. Various photographers aspiring to high art, during the 1850s and 1860s, aligned themselves with their English brethren, the Pre-Raphaelite painters, John Millais, Georges Watts, and Dante Gabriel Rossetti. They used the photographic medium to fabricate popular allegorical themes from literature and the Bible. Neither collage nor allegory was new to photography, but they had not been used to this extent. Oscar Rejlander was one of the earliest Pre-Raphaelite photographers, who made thirty separate negatives of models and through multiple printing created an amazing collage, measuring 16 × 31 inches, called *Two Ways of Life*, an allegory based on the famous Raphael painting *The School of Athens*. One of Rejlander's ways of life in the allegory featured overt nudity, appropriate to the theme but not to a Victorian audience. He was criticized for this but only after winning first prize in the Art's Treasure's Exhibition in Manchester, in 1857, and having the work purchased by Queen Victoria.

Henry Peach Robinson, a painter, illustrator, and photographer also produced allegories using multiple printing techniques which were less ambitious than Rejlander's. "Fading Away," which featured a healthy fourteen-year-old girl facing the moment of her death, was criticized as too morbid, probably because the photographs made the scene look too real. However, some in Victorian society thought the photograph "an exquisite sentiment" providing a glimpse into nineteenth-century Romantic sensibility. Robinson also published a famous "how-to" book, *The Pictorial Effect in Photography*, in 1869, complete with instructions and illustrations to produce photographs following methods used by the Pre-Raphaelite painters.

The collodion process lured two more in England to art photography, Lewis Carroll and Julia Margaret Cameron. Carroll, the writer of *Through the Looking Glass*, and *Alice in Wonderland*, was also a math lecturer at Oxford in England. He had a fascination, possibly obsession, with very young girls, especially Alice Lidell, the model for Alice in Wonderland, her sisters, and others, and decided to photograph them, often in allegorical costume and pose. Some of these photographs were nude studies, which again aroused Victorian criticism, which contributed to Carroll's laying down his camera and stating that the negatives in question would be destroyed at his death. The photographs that have survived showed a strong sensitivity to the subject and an almost fastidious practice of craft typical of all of Carroll's endeavors.

Julia Margaret Cameron was of the privileged class; she took up photography late in life as a hobby that became a consuming passion. Cameron was close to her mentor, and Pre-Raphaelite painter, George Watts, and attempted many allegories based on the Bible and on the King Arthur legends. Her portraits of Alfred Lord Tennyson, Charles Darwin, Henry Wadsworth Longfellow, and others, are exceptional and convey a unique style that is close-up and abstract, with harsh lighting. Although Cameron was a strong role model for women in photography, a medium dominated by men, it is perhaps misleading to characterize her as an early example of feminism by today's definitions. In her autobiography, *Annals of My Glass House*, she stated: "When I have had such men before my camera my whole soul has endeavored to do its duty towards them in recording faithfully the greatness of the inner as well as the features of the outer man." Cameron is best known for illustrating Tennyson's "The Idylls of the King." Somewhat less known are her sensitive portraits of women in which the poses, the titles, and the delicacy of these enigmatic pictures reveal another aspect of her complex oeuvre.

Allegorical photography aligning itself with Pre-Raphaelite painting resulted in some of the most ambitious and contrived art photography ever produced. And it had its critics. One of these, Peter Henry Emerson, was a physician with an English mother and an American father. He was a distant relative of Ralph Waldo Emerson, American essayist, who, shortly after learning the camera, stated

that he: "took several photographs that were destined to revolutionize photography and make my name in photographic circles." This prophesy was not far off the mark. His famous textbook entitled *Naturalistic Photography for Students of the Arts* (1889), considered an antithesis to Robinson's own book, *Pictorial Effect in Photography*, advocated the straight use of the camera without any manipulation of process or consideration of allegorical subject matter. "Naturalistic Photography" appears to be a revolutionary statement, yet within the context of art history, Emerson's images although not in the style of the Pre-Raphaelites were in the style of the "Naturalists" of the "Rustic" New English Art Club and of the French artist, Jules Bastien-Lepage.

Emerson produced a series of portfolios taken in the East Anglia region of England. He began the series in 1886 with *Life and Landscape in the Northfolk Broads* and ended it in 1895 with *Marsh Leaves*, which is considered his best work. Although making claims to be working with photographic reality, he idealized the peasants he photographed, often posed them in highly stylized compositions, and insisted on "soft focus" for atmospherics.

By the time Emerson's career declined, in 1891—he dramatically renounced his own thesis stating: "The Death of Naturalistic Photography"—he had already influenced, art photography's next phase. Pictorialism, from 1888 to 1912, was a universal style of aesthetic photography meant to evoke feeling and to elicit beauty over fact.

By the 1880s, photography had become a less complicated process with the development of the dry-plate. Practitioners proliferated, especially art photographers. Naturalism continued to have its supporters, in the work of Frank Sutcliffe in the English coastal town of Whitby, but Impressionism, Post-Impressionism, Symbolism, and Tonalism also influenced the Pictorialist photographers toward the turn of the century.

To the members who formed the "Linked Ring," a group trying to raise photography to high art in imitation of painting, in 1892, Pictorialism was a radical break with the photography that preceded it. The Ring started as an English gentlemen's club, (women were not admitted until 1900), and some of its members were Herschel Hay Cameron (Julia Cameron's son), Frank Sutcliffe, Frederick Evans (a distinguished architectural photographer), James Craig Annan, and others. They created their own exhibition spaces and "linked" their endeavors with Pictorialists in other countries. The *Linked Ring* advanced the camera club movement that still exists today. The Vienna Camera Club of 1891 with Pictorialist Henrich Kuehn, the Paris Photo Club of 1894 with Pictorialist Robert Demachy, and the New York Photo-Secession of 1908 with Pictorialist Alfred Stieglitz, Edward Steichen, and others, were some of these "links." Stieglitz, who may have had the greatest influence on the style, the direction of, and the institutionalization of art photography in the twentieth century, ironically received his first of 150 photographic awards from Peter Emerson.

Pictorialism featured some of the finest images in black and white and color (platinum, photogravure, gum bichromate, etc.) ever attempted by photographers. Of special note is the refinement of the gum bichromate process by Robert Demachy in France. This beautiful and complex photographic process formed a color bridge between the first hand-painted daguerreotype and the invention of the autochrome process by the Lumiére brothers, in 1907.

Pictorialism also influenced documentary photography. Following the American Civil War, Brady photographers (now independent), Timothy O'Sullivan, Alexander Gardner, and others such as the U.S. Army photographer, A. J. Russell, took their wet-plate skills on the road. The U.S. government and private corporations such as the railroads, paid photographers to document the American West. The geological survey expeditions in the United States (also in Canada) were some of the most difficult assignments photographers undertook with their large wooden cameras and darkroom wagons. From 1867 to the early 1880s, these public and private surveys provided information on geology, settlement, indigenous people, and natural resources. These survey photographs remain some of the most magnificent images ever made of this vast and unspoiled territory.

The most important of the government surveys were: the Clarence King 40th Parallel Survey from California to the Great Salt Lake, with photographer Timothy O'Sullivan (who briefly joined the Darien Expedition to Panama in 1870); the Lt. Georges Wheeler Survey West of the 100th Meridian ascended the Colorado River, with O'Sullivan and William Bell in 1871; the Francis Hayden Survey from 1870–1878 to the Yellowstone region and south to New Mexico and Arizona, with William Henry Jackson; the John Wesley Powell Survey of 1871–1882 to the Grand Canyon, Virgin, and Zion regions and the Upper Rio Grande Valley, with E. O. Beaman, James Fennimore, and Jack Hillers; and the California State Josiah Whitney Surveys of the 1860s to Yosemite, with Carlton Watkins.

Timothy O'Sullivan's photographs were some of the earliest and least romanticized images of the land. However, geologist King, looking for evidence of the theory of "Catastrophism" through God's interaction with earth, may have influenced O'Sullivan's choice of views. The Hayden surveys to Yel-

lowstone with William Henry Jackson included landscape painters Sanford Gifford and Thomas Moran. Together they planned their "picturesque" views. Some of Jackson's views were also destined for sale through Anthony's of New York. The aestheticization of the land, the expanding commercialism, and the easy access to the West following the "meeting of the rails" (the much photographed Promontory Point in Utah connecting East with West) brought closure to this period, but not before the portfolios of Jackson and Moran convinced the U.S. Congress to designate Yellowstone a national park.

Carlton Watkins of the Whitney surveys, had a forty-year career, starting as a studio photographer in San Jose, California. Although he is best known for his Yosemite photographs (1860s into the 1880s), his work took him from Mexico to Canada, and included documents of the early mining and lumber industries, legal land disputes, and California missions—tens of thousands of images many of which were exhibited in California and in New York. Of all the survey photographers, Watkin's personal style and complexity of composition perhaps best situates him as a figure transitional to the twentieth century art genre, "Landscape Photography." Watkins's work also helped paved the way for the designation of Yosemite as a national park.

Not all survey work was of the land. The photographers O'Sullivan, Hillers, Jackson, and later Edward Curtis, Carl Moon, and Adam Vroman also photographed the rapidly disappearing tribes of Native American. A very large collection of portraits survives, made mostly by Curtis, who began publishing portfolios on Southern tribes, in 1908 and completed this work with Volume 20, on the Alaskan Inuit, in 1930. By his death in 1952, at the age of 84, Curtis had made over 40,000 negatives, 2,200 photogravures, thousands of pages of text, and also wax cylinders of tribal languages.

Most photographs of Native Americans were "captivity portraits," those taken shortly after battle, "assimilation" photographs, showing Native Americans in government schools such as Carlisle, Hampton, etc., or "novelty" photographs, extreme poses of Indians often with implements of the dominant culture, such as automobiles, airplanes. These were just some of the ways that photographers represented the "other." Most photographs, including those of Curtis, romanticized the Native Americans as "noble savages" living in a world created by James Fennimore Cooper. Curtis occasionally over-posed his subjects or was not careful with their dress or artifacts in his portraits, but he was sympathetic to their plight and consistent in his approach to photographing, which he referred to as "The Twenty Five Cardinal Points." If anything, Curtis is guilty of applying the Pictorialist style to his ethnographic photographs.

Eadweard Muybridge, an Englishman living in the United States, was another survey photographer who made landscape and panoramic views in California and elsewhere during this period, but his finest work was as a photographer and inventor. Accepting a private commission to photograph a galloping race horse called Occident, Muybridge succeeded in making the first "action" photograph and is credited with the invention of the camera shutter. With this device he produced a series of motion studies using people and animals then continued this work with funding from the University of Pennsylvania and the American painter, Thomas Eakins. These motion studies culminated in the book *Animal Locomotion* (1887). When these studies were shown in a zoopraxiscope, an early movie projector, Muybridge became the inventor of the motion picture.

Toward the end of the century, one of the largest waves of immigrants arrived in New York Harbor and other ports, creating unprecedented social problems. To address these there emerged a new social science and a new category of photography, "social documentary." From 1882 to 1887, during one of the worst economic depressions in American history, half of the population of New York City, mostly immigrants, was unemployed and living in poverty. Among them, was Jacob Riis, an immigrant from Denmark, living in desperate conditions in police lodgings—the same lodgings he would later, as a journalist, expose through photographs and eliminate altogether with the help of Police Commissioner, Theodore Roosevelt. Riis used his camera as a "weapon," as a tool for social reform by publishing, in the newspapers, his photographs of squalid living conditions. His first of many books of photographs, *How the Other Half Lives*, was published in 1890 using the new half-tone printing process and together with written exposés and lantern slide lectures was to make a large impact on improving the life of the poor and the exploited.

Jacob Riis's successor, Lewis Hine, also reflected part of a larger new social science emerging during the Progressive Era beginning in 1890 that took a scientific approach to understanding poverty not as a "sin" but as an economic condition. Hine, was a photography teacher at the progressive Ethical Culture Center, in New York. He also worked as a photographer for the Pittsburgh Survey, a new sociological investigation, and the National Child Labor Committee (NCLC) and used his camera to expose the exploitation of children in their working environments. Lewis Hine's social documentary

photography set the stage for another group of photographers, the Historic Section of the Farm Security Administration (FSA), who worked during the Great Depression of the 1930s.

Photography had always been a technological art, and now as the century was drawing to a close, the wet-plate had finally gone the way of the daguerreotype and calotype. From 1880, it was gradually replaced by the dry plate process, using not collodion but gelatin and not requiring an instant darkroom. It was only a matter of time before gelatin would allow the glass plate itself to disappear, for roll film to come into being, and the hand camera to achieve popular commercial success.

There were, however, a few holdovers still using the glass-plate cameras. Eugène Atget started photographing Paris late in life after a somewhat unfulfilled career as an actor. He saw the changes occurring in his beloved city as modernity laid its claim on the boulevards and buildings and, like Charles Marville before him, thought he could preserve through photography what was still ancient and sacred. Atget continued to use his large wooden plate camera well into the twentieth century, and long after the Kodak had made everyone a potential photographer. Atget's work (over 10,000 plates) collected by Man Ray's assistant, Berenice Abbott, although primarily done on commission and in subject categories for sales has, over the years, been championed by the modernists, especially the Surrealists who were inspired by the haunting, empty cityscape populated by dolls and hats in shop windows—human surrogates functioning in another reality.

Paul Martin was one of the first photographers to use the latest hand camera, Fallowfield's Facile Detective camera, a noisy wooden, movable dry plate camera. Prior to this, the most portable cameras were the stereos used by nearly all large format photographers. Martin, a working class Frenchman who lived in England, photographed and exhibited his work through camera clubs and magazines. Using his Fallowfield camera he made some of the most modern, candid, and often serendipitous street photographs and night shots of a genre that began with the French calotypist, Charles Négre in the 1850s, continued with the London portfolio of John Thomson, the genre scenes of Frank Sutcliffe, and the turn-of-the-century work of Alice Austen in Lower Manhattan, New York City. Martin also made some sculpture pieces of fishmongers, very modern photo "cut-outs." Although offered a free Kodak, Martin, like Atget, continued to use his precious wooden camera.

In a shrewd, risky entrepreneurial venture, George Eastman of the Eastman Dry-Plate Company of Rochester, New York (1880) created an innovative portable hand camera. The preferred name for these first hand held cameras was the "detective camera," taken from popular literature. The cameras were novelty items disguised in walking canes, waistcoats, hats, and guns—few worked very well. The functional, inexpensive Kodak camera was designed with a short focal length lens of f/9, a shutter operated by pulling a string, and a roll of paper negative film of one hundred round frames. It included with the camera purchase, factory processing and reloading. The advertising read, "You press the button, we do the rest." Not just the film but the entire camera was sent back to the company following exposure. Unique, modern, and instantly popular, even the name "Kodak," was a designed acronym. The twentieth century had arrived.

PETER KLOEHN

See also: **Abbott, Berenice; Atget, Eugène; Camera Obscura; Eastman Kodak Company; Farm Security Administration; Film; Hine, Lewis; Impressionism; Linked Ring; Man Ray; Photo-Secession; Pictorialism; Riis, Jacob; Steichen, Edward; Stieglitz, Alfred; Surrealism; Szarkowski, John; War Photography**

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