

History of Photography and the Camera

“If you saw a man drowning and you could either save him or photograph the event...what kind of film would you use?”

-Anonymous

Cameras, and what they capture, forever changed our perception of the world, and of ourselves. Few inventions have had the impact of this ingenious, elegant, and deceptively simple device. Cameras are easy and creative tools that help people to express ideas and feelings. They help to document a person's feelings and life, and allow that person to share them with others. Cameras allow us to see historic events as they happened. Before photography, there were only drawings, paintings, and sculpture; some of them were accurate, some were altered to appeal to the model's vanity, or for dramatic effect. Eyewitness reports can be influenced by emotion, but photographic evidence has been considered accurate since 1880.

Throughout the history of photography, technological advances in optics, camera production, developing, and imaging have had an effect on the way people view images. Up until 1960, most printed photographs were black and white. Cameras that could print color film began to be popular in the 1960s, particularly with the introduction of the Polaroid camera invented by Edwin Land, which could print out a color film print directly from the camera, within a few minutes of taking the picture. Up until the advent of the digital camera, amateur photographers could either buy print film for their camera, or slide film. If they purchased slide film, the resulting slides could be viewed using a slide projector. Digital photography began to be available in the early 2000s. The simultaneous increased use of the Internet and email, relatively cheap computers and digital cameras has led to a tremendous increase in the number of photographic images in digital formats.

In the early part of the 21st century, the dominant method of viewing still images has been on computers and on cellular phones (although people still make and look at prints). These factors have led to a decrease in film and film camera sales and film processing, and has had a dramatic effect on companies such as Fuji, Kodak, and Agfa. In addition, many stores that used to offer photofinishing services or sell film no longer do, and those that do have seen a tremendous decline.

The web has been a popular medium for storing and sharing photos ever since the first photograph was published on the web by Tim Berners-Lee in 1992 (an image of the CERN house band Les Horribles Cernettes). Today popular sites such as Flickr, Picasa and PhotoBucket are used by millions of people to share their pictures.

It is likely that film will never again be purchased and used on the scale it was for most of the 20th century. However, it probably will not disappear altogether. At its advent in the early 19th century, many believed photography would supplant the painting of portraits and landscapes. In

the same way that acrylic and oil paint are still dominant media in use by artists and hobbyists, it is likely that photographic film and equipment will remain an option for enthusiasts.

Background

“The rarest thing in the world is a woman who is pleased with a photograph of herself.”
- Elizabeth Metcalf (Photographer)

Although no one knows for sure when a camera-type device was first discovered, the *camera obscura* became popular among Renaissance artists who used it to trace the image projected by light shining through a tiny hole.

The word “photography” was first used in the year 1839, the year the invention of the photographic process was made public. During the prior decades, a number of light-sensitive materials were tested to capture the image from the camera obscura, but the first successful permanent photograph is usually credited to Louis Daguerre. That picture, captured on a silver-coated sheet of copper, using his 'positive image' Daguerreotype process, is entitled *The Artist's Studio* and is dated 1837. Daguerreotypes were the forerunners to our modern film. A copper plate was coated with silver and exposed to iodine vapor before it was exposed to light. To create the image on the plate, the earlier Daguerreotypes had to be exposed to light for up to 15 minutes. The Daguerreotype was very popular until it was replaced in the late 1850s by emulsion plates.

By the time the details of this process were made public in 1839, other artists and scientists had discovered additional photographic imaging techniques. William Henry Fox Talbot's Calotype process used light-sensitive paper and produced a negative image that could be used to create positive prints.

These methods required long exposure time, therefore animate objects could not be recorded - no one could hold still long enough. The earliest photographic recordings were architectural and landscape scenes. By 1840, when techniques had improved and exposure times were shortened, Portrait photography became fashionable.

In the late 1850s, emulsion plates, or wet plates, were less expensive than Daguerreotypes and took only two or three seconds of exposure time. This made them much more suited to portrait photography, which was the most common photography at the time. These wet plates used an emulsion process called the Collodion process, rather than a simple coating on the image plate. Two of these emulsion plates were ambrotype and tintype. Ambrotypes used a glass plate instead of the copper plate of the Daguerreotypes. Tintypes used a tin plate. While these plates were much more sensitive to light, they had to be developed quickly. It was during this time that bellows were added to cameras to help with focusing.

In the 1870s, photography took another huge leap forward. Richard Maddox improved on a previous invention to make dry gelatine plates that were nearly equal with wet plates for speed and quality. These dry plates could be stored rather than made as needed. This allowed photographers much more freedom in taking photographs. Cameras were also able to be smaller so that they could be hand-held. As exposure times decreased, the first camera with a mechanical shutter was developed.

Depth of Field

“The quickest way to make money at photography is to sell your camera.”

- Anonymous

Photography was only for professionals or the very rich until George Eastman started a company called Kodak in the 1880s. In 1884, he developed dry gel on paper, or film, to replace the photographic plate so that a photographer no longer needed to carry boxes of plates and toxic chemicals around. This allowed him to develop a self-contained box camera that held 100 exposures of film. This camera had a small single lens with no focusing adjustment. The consumer would take pictures and then send the camera back to the factory to for the film to be developed, much like our disposable cameras today.

In July 1888 Eastman's Kodak camera went on the market with the slogan "You press the button, we do the rest". This was the first camera inexpensive enough for the average person to afford. The film was still large in comparison to today's 35mm film. It took until the late 1940s for 35mm film to become cheap enough for most people to afford. Now anyone could take a photograph and leave the complex parts of the process to others. Photography became available for the mass-market in 1901 with the introduction of the Kodak Brownie.

Film also allowed the movie camera to develop from an expensive toy to a practical commercial tool.

Despite the advances in low-cost photography made possible by Eastman, plate cameras still offered higher-quality prints and remained popular well into the 20th century. To compete with rollfilm cameras, which offered a larger number of exposures per loading, many inexpensive plate cameras from this era were equipped with magazines to hold several plates at once. Special backs for plate cameras allowing them to use film packs or rollfilm were also available, as were backs that enabled rollfilm cameras to use plates.

Except for a few special types such as Schmidt cameras, most professional astrographs continued to use plates until the end of the century when electronic photography replaced them.

35MM

“Photography is a way of feeling, of touching, of loving. What you have caught on film is captured forever...it remembers little things long after you have forgotten everything.”

-Aaron Siskind (Photographer)

Oskar Barnack, who was in charge of research and development at Leitz, decided to investigate using 35 mm cine film for still cameras while attempting to build a compact camera capable of making high-quality enlargements. He built his prototype 35 mm camera (Ur-Leica) around 1913, though further development was delayed for several years by World War I. Leitz test-marketed the design between 1923 and 1924, receiving enough positive feedback that the camera was put into production as the Leica I (for **Leitz camera**) in 1925. The Leica's immediate popularity spawned a number of competitors, most notably the Contax (introduced in 1932), and cemented the position of 35 mm as the format of choice for high-end compact cameras.

Kodak got into the market with the Retina I in 1934, which introduced the 135 cartridge used in all modern 35 mm cameras. Although the Retina was comparatively inexpensive, 35 mm cameras were still out of reach for most people and rollfilm remained the format of choice for mass-market cameras. This changed in 1936 with the introduction of the inexpensive Argus A and to an even greater extent in 1939 with the arrival of the immensely popular Argus C3. Although the cheapest cameras still used rollfilm, 35 mm film had come to dominate the market by the time the C3 was discontinued in 1966.

The fledgling Japanese camera industry began to take off in 1936 with the Canon 35 mm rangefinder, an improved version of the 1933 Kwanon prototype. Japanese cameras would begin to become popular in the West after Korean War veterans and soldiers stationed in Japan brought them back to the United States and elsewhere.

Exposure

"I didn't have my camera with me." –Jimmy Olsen

"A photographer eats with his camera, a photographer sleeps with his camera." -Perry White

"I'm glad I'm a writer." –Lois Lane

Around 1930, Henri-Cartier Bresson and other photographers began to use small 35mm cameras to capture images of life as it occurred, rather than staged portrait shots. When World War II started in 1939, many photographers adopted this style. The posed portraits of World War I soldiers gave way to graphic images of war and its aftermath. These images, such as Joel Rosenthal's photograph, "*Raising the Flag on Iwo Jima*" brought the reality of war across the ocean and helped galvanize the American people like never before. This style of capturing decisive moments shaped the face of photography forever, and was the advent of the photo-journalist. In the years since, photojournalists have been responsible for documenting and sharing history's most important stories with the public. Because of the powerful effects that are created when striking images are combined with strong words, photojournalism has not only played the role of documenting history, but has also been responsible for shaping it.

****One of the most exciting subcultures of photojournalism that has appeared in recent years is citizen journalism. With the technological advances of digital cameras, laptops, and cell phones that are equipped with cameras, millions of amateur photojournalists are now walking the*

streets. In fact, major news outlets like CNN have taken to incorporating the photos taken by these citizen journalists when major news stories break. As this technologically advanced citizenry continues to grow in size, there will be increasing opportunities for photojournalism of this sort to make its contribution to the field, and the history of photojournalism will continue to evolve in new and exciting ways.

In the early 1940s, commercially viable color films (except Kodachrome, introduced in 1935) were brought to the market. These films used the modern technology of dye-coupled colors in which a chemical process connects the three dye layers together to create an apparent color image.

At first color prints were not stable because organic dyes were used to make the color image. The image would literally disappear from the film or paper base as the dyes deteriorate. Kodachrome was the first color film to produce prints that could last half a century. Techniques are now creating permanent color prints lasting 200 years or more. Printing methods using computer-generated digital images and highly stable pigments, offer permanency for color photographs.

Instantly Digitally Disposable

“And every time he clicks those Kodak pix, he steals a little bit of soul.”

-John Prine (Singer/Songwriter)

While conventional cameras were becoming more refined and sophisticated, an entirely new type of camera appeared on the market in 1948. Polaroid photography was invented by Edwin Herbert Land. Land was the American inventor and physicist whose one-step process for developing and printing photos created instant photography.

His camera was the Polaroid Model 95, the world's first viable instant-picture camera. Known as a Land Camera after its inventor, the Model 95 used a patented chemical process to produce finished positive prints from the exposed negatives in under a minute. The Land Camera caught on despite its relatively high price and the Polaroid lineup had expanded to dozens of models by the 1960s. The first Polaroid camera aimed at the popular market, the Model 20 Swinger of 1965, was a huge success and remains one of the top-selling cameras of all time.

By the 1960s low-cost electronic components were commonplace and cameras equipped with light meters and automatic exposure systems became increasingly widespread.

The next technological advance came in 1960, when the German Mec 16 SB subminiature became the first camera to place the light meter behind the lens for more accurate metering.

The concept of digitizing images on scanners, and of digitizing video signals, in simple terms, works by digitizing signals from an array of discrete sensor elements. At Philips Labs in New York, Edward Stupp, Pieter Cath and Zsolt Szilagyí filed for a patent on "All Solid State

Radiation Imagers" on September 6, 1968 and constructed a flat-screen target for receiving and storing an optical image on a matrix. Their US patent was granted on November 10, 1970.

The first recorded attempt at building a digital camera was in 1975 by Steven Sasson, an engineer at Eastman Kodak. It used the then-new solid-state CCD image sensor chips developed by Fairchild Semiconductor in 1973. The camera weighed 8 pounds, recorded black and white images to a cassette tape, had a resolution of 0.01 megapixels (10,000 pixels), and took 23 seconds to capture its first image in December 1975. The prototype camera was a technical exercise, not intended for production.

Digital cameras differ from their analog predecessors primarily in that they do not use film, but capture and save photographs on digital memory cards or internal storage instead. Their low operating costs have relegated chemical cameras to niche markets. Digital cameras now include wireless communication capabilities (for example Wi-Fi or Bluetooth) to transfer, print or share photos, and are commonly found on mobile phones.

The improvements in film photography led to smaller and better cameras; the improvements made throughout the history of digital photography have led to more pixels, smaller cameras, lower costs and greater memory capacity.

Technology never stands still though. Few would have predicted the stunning growth of digital photography, even ten years ago. And now digital cameras outsell film. Some manufacturers have pulled out of the film market completely.

Fuji introduced the disposable camera in 1986. We call them disposables but the people who make these cameras want us to know that they're committed to recycling the parts, a message they've attempted to convey by calling their products "single-use cameras." While some disposables contain an actual cartridge as used for loading normal, reusable cameras, others just have the film wound internally on an open spool. The whole camera is handed in for processing. Some of the cameras are recycled, i.e. refilled with film and resold.

"Disposable" digital cameras forgo film and use digital technology to take pictures. The cameras are returned for "processing" in the same fashion as film cameras.

Current Developments

"Less artsy, more fartsy"

- Homer J. Simpson (American philosopher)

In the past, cameras were analogue while today, most are digital. Analogue produces less clear photos if transferred to different copies, while the clearness of digital remains pristine even when photo have been transferred and copied many times. Analogue cameras require films while digital requires a memory card. Digital photos allow the user to edit using programs on the computer; not so with analogue. Cameras today are much smaller than in the past and are much more convenient to carry and use.

Since early in the 21st century the majority of mobile phones in use are camera phones. The camera phone, like many complex systems, is the result of converging and enabling technologies. There are dozens of relevant patents dating back as far as 1956.

The Camera Phone was invented on June 11, 1997, by Philippe Kahn when his daughter Sophie was born. Kahn integrated a miniature camera into a Motorola cell phone and, as his wife Sonia Lee Kahn was in labor, broadcast pictures of the newborn baby around the world. The camera phone became the founding vision for LightSurf Technologies.

In Japan the first camera phones were developed for working professionals who wanted to keep an image of their children with them wherever they went and as they worked. The user interface was designed to be simple so that novices and children could also use the feature. The designers felt it was important to have the child's photograph displayed on the cellphone as accurately as possible.

The total number of cameraphones sold has already passed more than the total number of cameras sold in the history of photography. Cameraphones outsell traditional cameras by a ratio of 4 to one.

Social FX of Cameras and Photography

“The photograph may be presented as finely and artistically as you will; but to merit serious consideration, must be directly connected with the world we live in.”

-Berenice Abbott (Photographer)

No doubt the first impact of the camera was to document a period in time, for future generations to see. But the camera has had a wide ranging effect on human society. The ability of the camera to record the world as it is has made it an invaluable tool in scientific research. In its early days it was used to record evidence on field trips, show portraits of remote tribes people or newly discovered animal species. Photographic technology has led directly to scientific innovation in brain scanning and assessment of the human body.

A tangible impact of photography has been the number of people employed in the industry, particularly after the introduction of 35mm film in the 1920s by the Kodak company. That innovation meant a number of people were needed to sell and service cameras and films. Photography also meant new employment opportunities as photo reporters and editors, and in photographic agencies, libraries, and archive houses. The film and television industries would be non-existent without the invention of the camera.

There is no doubt that the cell phone camera has had a great social impact on the world. This small device has transformed our culture and society in many different areas. Some of these

areas include social interaction, crime-fighting, news gathering, and unfortunately, committing crime.

We will soon live in a world of ubiquitous video cameras. They are literally everywhere. There are video cameras on street corners, business premises, highways. The British have the most video cameras per head of population but other countries are catching up. The technology is cheap to install and operate.

Consumer video cameras are cheap and getting cheaper and better quality. There are consumer HD video cameras for under \$100. HD video is found in smart phones, and soon, every phone will have a high quality video camera.

But, it's not just phones. Because the circuitry and the mechanism for a HD video camera is so tiny, it can be fitted into ever smaller formats, such as spy pens, which are already on the market.

It won't be long before there are video cameras all around, operating in all our social spaces. Imagine living in a world where nearly every conversation, every meeting, every step you take in the physical world is recorded and archived in the cloud. If you knew that every conversation with your kids, with your parents, with your friends -- was possibly being recorded and stored -- would you think twice about what you had to say? The moral and ethical questions surrounding camera surveillance, Big Brother gov't, image-access on the Internet, and personal freedoms and rights loom large as camera and photography technology and access becomes easier.

Perhaps the most important, positive social effect of the camera was the advent of photojournalism. The emergence of photojournalism created new opportunities for photographers. These individuals were now able to travel virtually anywhere to document objects and events. The most significant benefit of photojournalism was its ability to push for social change by illustrating the problems associated with the society. Photojournalism was the first medium to convey social issues to mass audiences through the use of news magazines and other publications. Many of these magazines focused on the victimization that war creates. The prevalent underlying element in most journalistic photos is the undertone of humanistic ideals.

Developments in photojournalism were also beneficial to advertising and promotion. In fact, advertising and promotion were created by photojournalism. Before this time, there was no way for a company to show customers what they are selling. This type of photography was especially useful in showcasing products in magazines as an attempt to attract buyers.

Photojournalism also had an astounding effect on the fashion industry and the photographing of celebrities. The commercialization of such new subjects provided vast opportunities for individuals who were trying to break into the field of photography. These photographs were highly visible because virtually any magazine would contain them.

In addition, this medium also depicted celebrities such as famous actors and actresses of the time. This allowed people to read about their favorite celebrities and finally enjoy photos of these individuals. It also enabled agencies to promote celebrities in order for them to achieve higher statuses. In other words, photojournalism ultimately created a way for photographs such as these to have an impact on shaping the attitudes of individuals viewing these photographs. Before this time, these photographs would have not even been considered as an art form. However, through the popularity of photojournalism these photographs have had the chance to show that they document society and retain public interest.

To recap, the emergence and development of photojournalism has proved to be extremely beneficial in a number of ways. Photojournalism was the first medium to depict social problems throughout the world to mass audiences. In fact, many people's attitudes about society changed through the widespread commercialization of journalism. Also, Photojournalism provided advertising and promotion companies with new ways to attract buyers. Celebrities and industries such as fashion also thrived with the emergence of photojournalism, because it gave individuals and industries a way to become highly visible. Finally, photojournalism has utilized newer techniques such as color and digital imaging in order to display current technology and the benefits associated with such technology.

Photojournalism proves without a doubt how the camera is an important means of illustrating life.