

A NEW TECHNOLOGY, A NEW ARTFORM

Throughout history artists have explored the creative potential of emerging technologies. The invention of photography in the nineteenth century, perhaps more than any other medium, gave us a whole new way of looking at the world.

In 1827, a French scientist, Nicéphore Niépce, took what has since become the world's oldest existing photograph by exposing a tin plate coated with a light-sensitive material for eight hours inside a **camera obscura**. Niépce worked with French artist Louis-Jacques Mandé Daguerre (1789–1851) to improve the process and within a few years Daguerre had developed a faster, cheaper and more convenient process, which preserved the images on copper plates. Photographs produced in this way were known as 'daguerrotypes'.

Early cameras were cumbersome and required time, patience and a considerable technical knowledge. Many different types of camera were developed but they were all modelled on the camera obscura—a dark box with an opening, or 'aperture', at one end for light to enter and a recording, or viewing, surface for capturing the light at the other end. The size of the aperture and the brightness of the scene dictate the amount of light that enters the camera during the **exposure time**, and the exposure time is controlled by a shutter which is opened to allow light through the aperture. In low light, the shutter is opened for longer to allow the film to capture enough light to create an exposure. Before each exposure, a light-sensitive plate would be inserted in the back of the camera to record the image.



Early photographs mimic the painting genres of the time, such as portraiture, landscape and still life. The 'stillness' of still-life compositions was essential because early photographs required particularly long exposure times. The photographer could also control the composition and the lighting better using inanimate objects in a studio. For *Still Life in Studio*, Daguerre selected a window setting to make the best use of the **available light**. His objects include a sculpture, several plaster casts of cherubs, a ram's head, a framed picture, a hanging basket and some fabric. Daguerre had an artistic background—prior to photography he was famed for his **dioramas**—and the objects he selected reflected his interests.

← Louis-Jacques Mandé Daguerre, 1789–1851, French. *Nature morte: Intérieur d'un cabinet de curiosités (Still life: Cabinet of Curiosities)*, 1837. Daguerrotype, 16.5 x 20.3 cm.

Daguerrotypes became extremely popular, particularly to make portraits. In the mid-nineteenth century there was huge demand for portraits from the new middle classes, who wanted to record their wealth and success and had the money to commission portraits. For the first time in history, the daguerrotype provided a way to record the exact physical likeness of the subject and the daguerrotype was called a 'mirror with a memory'. The daguerrotype provided portraits that were quicker, less expensive and more accurate than traditional portraits painted in oils, and the demand for them around the world helped photography develop technically and artistically.

At the same time as Daguerre was refining his photographic process in France, an Englishman named William Henry Fox Talbot was perfecting his own photographic procedure, called 'calotype' photography. Talbot created the process of printing positive images from negative exposures, and this would eventually allow multiple prints to be created from a single negative. The calotype eventually gained predominance over the daguerrotype and is the first direct predecessor of film photography.



French photographer Félix Nadar (1820–1910) opened his first photography studio in 1854, and he photographed many of the outstanding figures of the era, literary, artistic, dramatic, political, and intellectual. The French actress Sarah Bernhardt was about twenty when she posed for Nadar. Because this was a portrait photograph, Nadar set out to capture a true likeness, as well as the personality of his sitter. He has wrapped her in swathes of drapery; one shoulder is bare but nothing more of her slender body is shown, centring all attention on her head, which is seen almost in profile. The photograph showcases both his technical proficiency and his understanding of artistic convention. He has used lighting from one side, which models the face and folds of material in soft chiaroscuro, and he has positioned Bernhardt's right hand against her cheek to draw our eyes to the face of the young actress. Nadar had a successful career as a satirical cartoonist, which requires skill in reducing the identifying characteristics of a subject to a single distinct feature. This skill proved effective in capturing the personalities of his photographic subjects.

↑ Félix Nadar, 1820–1910, French. *Portrait of Sarah Bernhardt*, 1859. Albumen print, 84 x 43 cm.

The style of the earliest portraits reflects the technical challenges of the day—sitters needed to remain perfectly still during the long exposure times and had to be exposed with available light. The photographers also used the same aesthetic style of oil portraits of the time, and the sitters are generally in stiff and unsmiling poses, against painted backdrops and lit with the soft light of an overhead window and whatever other light could be reflected with mirrors.

Frederick Scott Archer's development, in 1850, of a process known as the collodion wet plate resulted in a steep reduction in exposure times. But now photographers had to prepare and develop their glass plates on the spot, usually in a mobile darkroom, using many toxic chemicals. In spite of these drawbacks, by the latter half of the nineteenth century the wet-plate process was in widespread use.

In 1884, American photographer George Eastman produced a new photographic technology that would make photography accessible to ordinary people. His 'dry-plate' process meant that photographers no longer needed to carry around boxes of wet plates and toxic chemicals. Eastman also pioneered the transparent roll film which allowed photographers to expose successive images on a continuous spool of film which could be developed later. In 1888, Eastman's Kodak Brownie camera went on the market with the slogan, 'You press the button, we do the rest'. The Brownie was a basic, affordable cardboard box camera with a simple lens that took 5.7 cm square pictures on a roll of film. At the same time, the halftone process of printing was invented, which made it possible for many inexpensive prints to be made from one negative. Photography had become available for the mass market.

Photographers became alarmed by the vast quantities and low quality of snapshots taken by the owners of Kodak cameras. They experimented with new darkroom techniques and photographed interesting subjects to distinguish their photographs from the snapshots of the masses.

Artists had been fascinated by the potential of photography from the very beginning, and artists such as Julia Margaret Cameron made successful attempts with art photography, exploring photographs as artworks rather than as simple documentary representations of reality. In the nineteenth century, American photographer Alfred Stieglitz (1864–1946) led the pictorialism movement, which sought to ally photography with the fine arts. Stieglitz probably did more than any other individual to promote photography as an art at the same level as other arts; he has been called the 'patron saint of straight photography'. In 1902 he became one of the founders of the Photo-Secession, a group of talented avant-garde artists. In 1905 he also founded and directed the Photo-Secession Gallery in 291 Fifth Avenue, New York, which came to be known as the '291' and exhibited the work of contemporary photographers as well as works of the modern artists Picasso, Rodin, Matisse and Toulouse-Lautrec. Stieglitz did much to promote photography and to get it talked about. The photographers who belonged to the Photo-Secession group embraced abstract imagery and real-life urban and industrial subjects, and their straightforward approach went on to characterise twentieth-century photography.

Critics claimed that photos robbed the viewer of the chance to use his or her imagination and argued that a photograph was a documentary medium, lacking the creative elements of true art. However, photography was taken up and used by artists in such a vigorous way that the arguments about whether photography was 'art' became immaterial and, throughout the twentieth century, artists continued to explore photography and film technologies.

By the end of the nineteenth century, photographers were experimenting with showing multiple sequences of still photographs to create the illusion of moving images. Scientists were already using photography to record and study movement. An example is Eadweard Muybridge, who used photography to study human and animal locomotion in 1887.

Shortly after George Eastman's transparent roll film became available, in 1888, the motion picture camera made its first appearance. In 1891, American inventor and scientist Thomas Edison (1847–1931) designed a camera to take sequences of single images on roll film that, when projected at a particular speed, gave the illusion of continuous movement. These cameras became known as 'movie', or 'ciné', cameras.

THE DIGITAL AGE

Digital camera technology is directly related to and evolved from the same technology that made possible the first recorded television images. In 1951, the first video tape recorder (VTR) captured live images from television cameras by converting the information into electrical impulses and saving the information onto magnetic tape.

In 1963, a student at Stanford University invented a camera that could take a photograph and store the image on a disk for several minutes. This was the precursor to digital photography, which opened a whole new chapter in photography. In 1981, Sony unveiled the Sony Mavica camera, which saved images to disk but was not fully digital.

Kodak made history in 1990 when it unveiled the DCS 100, the first commercially available digital camera. It was so expensive that only professional photographers used it, but commercial digital photography was born.

During the mid-1990s, digital cameras that worked with a home computer were introduced, and Kodak collaborated with software giant Microsoft to create digital image-making software that allowed customers to produce photo CD discs and photographs and to add digital images to documents. Kodak also worked with computer hardware company IBM to create an internet-based network image exchange. Hewlett-Packard was the first company to make colour inkjet printers, a timely innovation that complemented the new digital camera images.

Digital cameras have a lens, aperture and shutter but they do not use film. Instead they have a device called an image sensor, which converts light passing through the lens into electrical impulses. The final image is composed of a series of square picture elements (pixels). The digital images can be downloaded onto a computer and, using editing software, manipulated with ease. This aspect is of special interest to artists. Images can be manipulated, edited, cropped and enhanced, using editing software.

Initially, the image quality of digital photographs was not as good as that of analog photographs. Art photographers have tended to prefer medium-format and large-format cameras to 35mm film, but with the rapid improvements in the more sophisticated forms of digital photography, especially the latest digital SLR cameras, this is changing. Both art photographers and commercial photographers are embracing digital photography.

Parallel to the development of digital still cameras is the evolution of digital movie cameras. The camcorder contains both camera and recorder in one unit, and early in their development required two separate devices, a video-camera and a VCR. Camcorders are now generally digital, capable of recording live-motion video and audio onto a storage device for later replay through VCRs, TVs, or computers. Thanks to price reductions and size reductions, the technology has become accessible to a wide audience. Until recently, video editing was a difficult task which needed a minimum of two recorders. Today, a PC can perform digital video editing with low-cost editing software that has become widely available.

Advancements in technology have made the editing of moving and still picture relatively easy for even the novice photographer. Digital images can be displayed on a web page, sent via email, stored on a computer hard drive or a compact disc, printed on a page, or reproduced on large sheets of archival-quality photographic paper for exhibition. Digital point-and-shoot cameras have become widespread consumer products, outselling film cameras, and include features such as digital video and audio recording.