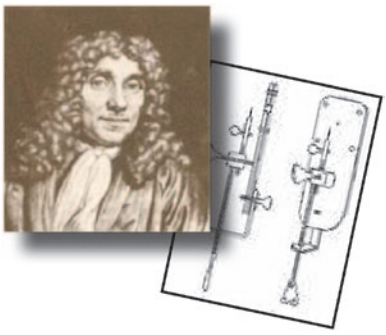
Pioneers in Optics: Louis Daguerre and George Eastman



Michael W. Davidson
National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306

davidson@magnet.fsu.edu

Louis-Jacques-Mandé Daguerre (1787–1851)

Born near Paris, France on November 18, 1787, Louis-Jacques-Mandé Daguerre was to become both a painter and the inventor of the first successful form of photography. Originally trained as an architect, Daguerre later became a pupil of E. M. Degotti at the Paris Opera and a thriving scene painter. In 1822, working with Charles Boulton, Daguerre helped develop the Diorama, a Paris illusionistic exhibition that contained paintings on large translucent screens, which seemed to come to life with skillful light manipulation.

As an artist, Daguerre was interested in creating realistic renderings and utilized a camera obscura to aid his efforts. In hopes of simplifying the process, he became intrigued with the idea of permanently fixing an image chemically, as were many others during the period. Daguerre began his initial explorations alone but soon was introduced by his optician to Joseph-Nicephore Niepce, who was working towards a similar goal. Hesitant at first, the pair decided to collaborate, primarily concentrating on silver-plated copper sheets treated with iodine to make them sensitive to light. A view from Niepce's studio window taken in 1826 is considered the oldest existing photograph, but the process they used at that time was not practical for wide-scale applications because it took eight hours to expose. Daguerre and Niepce worked together from 1829 until Niepce's death in 1833. Although, Daguerre was once again alone in his experiments, he had made excellent use of his time with Niepce and had learned enough to make important advances.

Finding the proper developing agent was the key to Daguerre's success, and it occurred quite by accident. Daguerre had placed one of his treated copper plates in a cabinet that contained a variety of chemicals and was surprised to later find a clear image had developed on the plate. Through the process of elimination, he found that the substance he was seeking was mercury vapor that had leaked from a broken thermometer. The discovery meant that images could be exposed in about twenty minutes, rather than several hours. Daguerre further improved the photographic process that he and Niepce had developed by utilizing sodium chloride to permanently fix pictures and, by 1839, was ready to release his knowledge to the public. He called the photographic system the daguerreotype and attempted to sell the process by subscription, but met with little success. However, Daguerre gave a full description of his process at the French Academy of Sciences on January 9, 1839 and gained the notice of Francois Arago, a prominent member.

Arago's praise of Daguerre's photographic technique led to the French government's purchase of the rights to the process in exchange for annuities to be paid to Daguerre and Niepce's heir, as well as a worldwide curiosity in the technique. Daguerre patented the photographic process in England, but the French government revealed the process to the world like a gift. An instruction manual was written by Daguerre and within months was published in numerous languages. Soon, there was a great demand for daguerreotype portraits and the process, which fascinated the public, became extremely popular. Anyone, except those living in England, could freely use the daguerreotype process, and many utilized it for commercial benefit.

Still, the daguerreotype process had serious limitations. The imprinted images that were obtained through Daguerre's technique were clear, but fragile. Relatively heavy because they were produced on metal, the images were further weighed down by the need for a cover plate or frame to protect their delicate surface layers. Furthermore, each daguerreotype image was unique and could not be copied, a problem that was avoided in a photographic process developed by William Fox Talbot at approximately the same time. Also, the bulky equipment required a new metal plate for each image; this made the process fairly costly and outdoor photography impractical.

After several years of widespread popularity, use of the daguerreotype began to dissipate in the face of further photographic advances, most notably the development of the wet collodion process. Only about four months after the release of Frederick Scott Archer's more convenient method of photography, Daguerre died in Bry-sur-Marne, France on July 12, 1851.

George Eastman (1854–1932)

From humble beginnings, George Eastman revolutionized the field of photography by simplifying the process and making it accessible to the masses. The youngest of three children, Eastman was born in Waterville, New York on July 12, 1854. His family moved to Rochester when he was still a young child so his father, George Washington Eastman, could establish a business school. However, his father died in 1862 and the institution failed.

At the age of 15, Eastman was forced to leave school to seek employment because of the family's financial difficulties. He began as an office boy in an insurance company, slowly

 doi: 10.1017/S1551929510000118

moving his way up, and studied accounting in the evenings. In 1874, Eastman's extracurricular studies helped him acquire a position as junior clerk at the Rochester Savings Bank. The increase in income enabled him to consider activities he had not been able to afford previously, and in 1878, Eastman bought wet plate photographic equipment with the intention of recording a vacation he was planning. Although he never took that trip, the purchase changed his life forever.

The wet plate process commonly employed at the time was complex and required heavy, bulky gear that made it inconvenient to move. Eastman realized that there must be an easier method of photography and soon became immersed in experiments as he attempted to perfect a simpler dry plate process. He succeeded in his endeavor, and by 1880, he had developed a machine that could mass prepare his dry plates. That same year Eastman officially went into business, selling the plates to other photographers. Initially lucrative, the dry plate market soon became inundated with competitors, and Eastman was forced to find a way to distinguish his product.

Eastman continued his photographic experimentation, primarily focusing on finding a lighter and more flexible photograph backing than plates of glass. In 1884, he patented a paperbacked film, and roll-holders to use with the material soon followed. The new photographic system was instantly successful, but Eastman was intent on reaching an even wider consumer base. He was struck with the idea of selling a preloaded camera that was sent back to the company for development and printing, making photography possible even for amateurs. In 1888, the first Kodak camera was ready to be sold, and Eastman advertised in the leading periodicals, introducing photography to the general public to much acclaim. Consumers were impressed with the relative ease of photography, now only having to push a button to take a picture, and the company's triumph made Eastman an extremely wealthy man.

Remarkably generous, Eastman was fond of supporting a variety of causes and business endeavors. Some of his most notable philanthropic acts included establishing a music school, a theatre, and a symphony, as well as contributing toward the development of a hospital and medical school in Rochester. He also frequently contributed to educational facilities, such as the Massachusetts Institute of Technology and the Tuskegee Institute. Eastman's generous nature also carried over into his business pursuits, establishing the first profit-sharing plan for employees and offering retirement and health benefits when most other businesses did not.

MT

https://doi.org/10.1017/S1551929510000118 Published online by Cambridge University Press