

IMAGE NOTES

Inventors in Imaging Technologies

1. Joseph Di Nunzio

Portrait of George Eastman ,1919

George Eastman is the founder of the Eastman Kodak Company. He is one of the three inventors we will be looking at today. We'll examine the major discoveries of each and see how they touched the lives of people all over the world.

Mr. Eastman was born in 1854 in Waterville, New York. Young George Eastman was six years old when his father moved the family to Rochester, New York. When he was eight his father died, and his mother was left to raise him and his two sisters. She ran a boarding house to earn money.

Mr. Eastman left school at the age of 13 to work and support his family. He would eventually land a job as a clerk at the Rochester Savings Bank. In his spare time he took up photography. He bought himself a camera and tripod and all the heavy, messy accessories of early photography; and took lessons until he knew the basics of making photographs.

2. Man outfitted with a portable darkroom

Photography was much different at that time. It wasn't as easy as carrying around a small camera and pressing a button. People went to studios to get a picture taken. Outside the studio, photographers would have to carry almost 50 pounds of equipment. Some of these important items included glass plates, bottles of chemicals, stirring rods, measuring glasses, a tripod, and dark tent or box (which served as a darkroom), and of course the camera.

3. Coating the plate with collodion

The reason for all this equipment was because there was no such thing as a roll of film in the 1870s. Photographers used "wet plates" for taking pictures. These glass plates were coated with a chemical mixture, called "collodion," and then with silver nitrate solution, making the plate sensitive to light, or "light sensitive." This solution of chemicals on the glass plate was known as an "emulsion." The wet plate was put into the camera, and then exposed and developed while it was still wet. That's why the tent or dark box was needed. The photographer essentially had to carry his darkroom with him, often on his back!

4. Kessler

Cartoon of George Eastman using wet plate photography, 1923

Here is a cartoon of George Eastman, marching off to take pictures. He often attracted crowds, either because of how unusual he looked with all his supplies, or merely because everyone wanted to be the subjects of his photographs. He loved taking pictures. The

only thing that bothered him was the inconvenience of carrying everything along. He wanted to find a better solution to the leaky chemical bottles and heavy equipment. There must be an easier way.

5. Eastman's Gelatine Dry Plates- (original box)

Mr. Eastman read that in England photographers were using "dry" plates. These glass plates were coated with a gelatin emulsion that remained light sensitive even after it dried. Now photographers could prepare the plate before they went out in the field, and could bring it back and develop it at home. He put all his spare time into developing his own gelatin formula. Finally, he made an emulsion that remained light sensitive when dry. He also invented a machine to coat the emulsion onto glass plates— and even got his invention patented. Now George Eastman was using what was known as the "Dry Plate" process, and making plates for customers. His new business, the Eastman Dry Plate Company, was located on State Street in Rochester, NY.

6. George Eastman at his desk

Mr. Eastman still felt that the camera could use further simplifications. His goal was to invent a camera that was easy enough for anyone to use. He worked long and hard to develop a simple camera, spending days researching and experimenting and he even slept at the factory overnight when he was too busy to leave. He had virtually no time to relax. He spent from 3:00 p.m. until breakfast at his factory, while still working days at the Rochester Savings Bank. He didn't decide to leave the bank job until his dry plate business was off the ground.

7. Kodak Camera

Finally, he had done it! In 1888, the company introduced the "KODAK." The Kodak camera cost \$25.00 and came loaded with a roll of flexible film which could take up to 100 pictures. George Eastman helped to invent this flexible film, which was rolled up on spools inside the camera. The film was coated with the light sensitive gelatin dry emulsion. The photographer never had to worry about developing the pictures. When all 100 pictures were taken, the camera was sent back to the Eastman "Kodak" Company, where workers would develop the film, make prints, reload the "Kodaks", and send everything back, all for \$10.00 per roll.

Eastman wanted to call his camera something unique, something that people would remember and that didn't already mean anything in any language. He started with the letter "K" (his mothers maiden name initial, she was Maria Kilbourn), and played with the alphabet until he had the name "Kodak." Everyone all over the world would be able to identify the word "Kodak" with his products.

8. Kodak instruction sheet

Here are the instructions for the Kodak. See how simple it was to use compared to all that earlier photography equipment. Now almost anyone could take pictures. This was part of the beginning of popular photography. Instead of going to a portrait studio for a formal picture, or struggling to learn and use all of the cumbersome equipment of the time period, now anyone could make a photograph simply by pressing a button and advancing the roll of film to a fresh piece for a new picture. Someone else handled all the developing. Eastman's original slogan? "You Press The Button. We Do The Rest."

9. Unidentified Photographer Kodak State Street Factory, 1891

Here is the Eastman factory on State Street in Rochester, New York. The box-like building even resembles a box camera. Eastman's company was expanding to areas all over the world. George Eastman, the once-poor bank clerk, was now a very rich man. He would soon produce a camera for children, called the "Brownie." Soon taking pictures would become an everyday part of our way of life.

10. Unidentified Photographer George Eastman House, ca. 1905

Eastman had this mansion built for himself and his mother in 1905. He never forgot his mother's earlier hardships and made sure she was always comfortable. The Colonial style mansion on East Avenue took three years to build, and has 37 rooms, and formal gardens. When Mr. Eastman was alive, it even had a working farm in the back! At the time it was the largest private home in Monroe County. It still is the largest house in this city!

11. George Eastman's third floor workroom

The mansion even had a laboratory on the third floor where Eastman could work. Over the years he grew to be a very successful man, owning companies all over the world, employing thousands of people. He refused to retire, continuing to work actively until he was in his 70s.

12. George Eastman House

This is the Eastman House today. It is now a museum of photography and film, as well as a local and national landmark. Here people can learn about Eastman's life by touring his house and gardens, recently restored to their early twentieth-century appearance. People can also learn about the history of photography and see exhibits of photographers' work in a newly-added research center and gallery attached to the back of Eastman House, right where Mr. Eastman once had his farm.

While he lived in this house, Mr. Eastman gave away millions of dollars to what he thought were worthwhile causes. He supported several colleges, realizing the importance of education (which he himself was not able to have). He built the Eastman Theatre, where music is performed to this day. He donated land create to Cobb's Hill and Durand-

Eastman parks. He donated money to build dental clinics for children in Rochester, and also London, Rome, Paris, and Stockholm. Do you know where the Eastman Dental Clinic is today? Eastman thought it was important for children to receive early dental care. Mr. Eastman wanted to make Rochester a great place to live.

13. Letter from W.K.L. Dickson to Eastman Kodak Company

Here is an early note to the Eastman Dry Plate Company from the laboratory of another famous inventor, Thomas Alva Edison. Edison used George Eastman's roll film, and this note records a payment for the film received. Edison used it in one of his later inventions, the motion picture camera.

14. Unknown Photographer George Eastman and Thomas Edison, 1928

Here is a picture of Eastman and Edison together. Eastman and Edison were friends as well as business associates. The discoveries of one inventor can always assist another. Has anyone heard of Thomas Edison? What other things did he invent?

15. Thomas Edison, ca. 1900

Thomas Edison was born in 1847. He was a very curious young boy, who was always fascinated with how things worked. He was born to poor and humble parents, yet someday he would prosper as a brilliant inventor, responsible for 1,093 patented inventions!

16. Edison birthplace, Milan, Ohio

Photograph courtesy of U.S. Department of Interior, National Park Service

This is the house in Milan, Ohio where Edison was born. He had little formal education. One of his teachers once said that he thought Edison's mind was "addled." What some might have called "addled" was actually an uncanny curiosity that led him to invent things we still use today.

17. C.W. Briggs Company Thomas Edison with Phonograph

His first employment experience was working as a telegrapher, transmitting and receiving messages. He was constantly searching for improvements to the telegraph system. He worked as a transmitter at night, and during the day he worked on his inventions. His mind was always thinking about improvements and inventions. In this lantern slide Edison is pictured listening to one of his inventions, the phonograph.

18. Transmitting telephone

Photograph courtesy of U.S. Department of Interior, National Park Service

One of his first inventions that he would be paid for was the transmitting telephone. The early telephone was invented by Alexander Graham Bell. It was the answer to the telegraph. With Bell's invention, the world now had a speaking telegraph. However, Bell's telephone didn't have the power to transmit voices loudly and clearly. It needed a good transmitter. Edison went to work to invent one.

Finally, he did. But Edison and Bell worked for rival companies: Edison for Western Union, and Bell for the recently established Bell Telephone Company. Both companies fought for exclusive rights for the telephone. One had the original working receiver and the other had the improved transmitter. After a fifteen-year battle the courts decided that each company's invention was its own. In the end, Western Union bowed out of the telephone business and sold its rights to Bell.

19. Original tin-foil phonograph

Photograph courtesy of U.S. Department of Interior, National Park Service

Edison's more famous experiments came a bit later. Almost by accident, while working on the telegraph, he stumbled upon an interesting idea. For four months he worked on inventing a telephone that could record conversations. By rigging a device with tin foil on a grooved cylinder, he tested the first phonograph in 1877. To his astonishment, it played back his words, "Mary had a little lamb, its fleece was white as snow..."

20. Edison with tin-foil phonograph

Photograph courtesy of U.S. Department of Interior, National Park Service

Edison became world-renowned for this great invention. He and his phonograph were even invited to the White House. There were a million reasons why people could use it. It could teach people to speak better, record business letters without a secretary, and read to the blind.

21. Edison's talking doll

Photograph courtesy of U.S. Department of Interior, National Park Service

It could even be used to make a child's doll talk.

22. Edison's perfected phonograph

Photograph courtesy of U.S. Department of Interior, National Park Service

Edison worked to perfect the phonograph. Here is an example of a later model. With the phonograph came a new element of leisure; people could now record and play back music, or even their own voices. Edison was pleased with this invention, but there was another idea peaking his curiosity.

23. Thomas Edison- light bulb

In late summer of 1878, Edison became interested in the research being done using electricity for light. He realized that it involved more than just one invention. It would include lamp holders, switches, meters and more. He conducted thousands of experiments, starting with the lamp. He worked for more than a year. Finally, in October of 1879, Edison successfully tested his first lamp. It burned for several hours. The Edison Electric Light Company was born and with future improvements it would light up homes all over the world.

24. Edison with his second wife Mina circa 1908

Photograph courtesy of U.S. Department of Interior, National Park Service

Unlike George Eastman, Edison got married and had six children. His first wife was a young woman named Mary Tilwell and he had three children with her. She died from typhoid fever and Edison remarried. His second wife, Mina Miller, bore him three more children. This is a photo of Mina and Thomas Edison taken around 1908.

25. Catharine Weed Barnes

No 176 Mr. Thomas A. Edison's House, ca. 1886- 1891

Here is the Edison family's home in New Jersey. He became a successful and wealthy inventor with connections worldwide. Long hours and hard work were rewarding but even more work needed to be done.

26. Kinetograph interior

Photograph courtesy of U.S. Department of Interior, National Park Service

In 1887, a thought occurred to Edison. "What if a machine could do for the eye what the phonograph does for the ear? Could motion and sound be reproduced?"

In 1888, Edison successfully tested the first moving picture camera, which he called a *kinetograph*. Using Eastman's film in a continuous flexible filmstrip, he was able to reproduce motion.

27. Kinetograph in use

Photograph courtesy of U.S. Department of Interior, National Park Service

In 1894, "The Great Train Robbery", the first moving picture with a plot, opened on Broadway at the Kinetograph Parlor. People dropped coins into slots and could view the moving pictures through the kinetograph, also known as the kinetoscope.

28. Unknown Photographer

Eastman and Edison with motion picture camera, 1928

Edison's motion picture camera (using Eastman's film) became a tremendous advancement in leisure time activities. The Eastman Kodak Company grew to become a great enterprise, due, in large part, to Edison and the public's use of Kodak film. This

photograph depicts Thomas Edison visiting George Eastman at his home in Rochester, NY. They are using a movie camera.

29. Black Maria

Photograph courtesy of U.S. Department of Interior, National Park Service

This was the studio where early Edison films were made. Called the "Black Maria" (ma-RYE-uh), it was covered with tarpaper and actually rotated to take advantage of the sunlight throughout the day. Here, the Black Maria is shown on the grounds of Edison's laboratory in West Orange, New Jersey. Later, George Eastman would build his Eastman Theatre; its original purpose was to show moving pictures.

30. Thomas Edison looking through a flouroscope

Photograph courtesy of U.S. Department of Interior, National Park Service

Edison had contributed a great deal to human advancement, and many inventions would follow that changed the way we saw the world. In 1894, a new discovery helped us see a new hidden world: the X-ray.

31. Portrait of Roentgen

Photograph copyrighted by Radiology Centennial, Inc

Wilhelm Roentgen, a German physics professor, invented the X-ray in 1894. Roentgen was known for his devotion to research and set up a small lab beneath his residence for conducting physical experiments. One night, he was studying a Crookes tube, a glass cylinder with the air pumped out of it, through which an electric current would pass. While studying it, he observed a greenish glow radiating from the tube. The glow intrigued him, and he set out to learn more about these rays. He called them X-rays, because X is the mathematical symbol for the unknown.

32. Roentgen's laboratory

Photograph copyrighted by Radiology Centennial, Inc

Roentgen found that the rays penetrated certain surfaces, making them transparent, but also allowed other images or objects to remain opaque. Upon developing what appeared to be foggy film plates, he found that a key on top of his desk was recorded on the plate, while the desk remained transparent. The plates had been in the same room as the X-rays! The rays had gone through the desk to get to the plates, but had been blocked by the key. Here is the laboratory in the Physical Institute of the University of Wurzburg where he made his discovery.

33. Nickolas Muray

Hand and Machine, 1962

Roentgen began taking X-ray photographs of his hand. The rays penetrated his hand and left shadows where his bones were!

34. Unknown Maker

X-ray of human hand with ring and bracelet, ca. 1950

Here we can see a few examples of how X-rays help us see our internal area. How does this invention help medical science? Has anyone had an X-ray taken before?

35. Unknown Maker

Radiograph- forearms, 1937

This is an X-ray of human forearms. One use of X-rays would be to see if a bone is broken.

36. Keystone View Company

French field hospital- locating bullet with X-ray machine, ca. 1914-1919

Roentgen finally shared his discovery with the world. It received mixed reactions. Most people feared X-rays. Some believed Roentgen had stumbled upon death rays that would destroy humanity. Fortunately, the medical world saw its potential. Doctors immediately began using X-rays to diagnose problems in the human body. This stereoview is labeled: "French Field Hospital- Locating Bullet with X-ray Machine"

37. H.E. Seemann

Alarm clock and magazine cine Kodak camera, ca. 1937

Roentgen's discovery not only assisted the medical field; it helped other fields of study as well. Industry uses X-rays to detect flaws and weaknesses in pipes, boilers, insulation, and other equipment. X-rays can help you see how something is constructed without taking it apart. These 'radiographs' show the interiors of a clock and a cine Kodak movie camera.

38. Unknown Maker

X-ray of handbag and contents, ca. 1950

Here is an X-ray of a purse and its contents. Where are X-rays used for this purpose?

39. Unidentified Photographer

Reproduction of radiograph of mummy, ca. 1950

The art world uses X-rays to help identify old paintings. Archeologists use X-rays to see inside of mummy tombs. Can anyone think of other uses for the X-ray?

40. Josef Maria Eder

Aescalapius Snake, 1896

So where was Thomas Edison at this time? Edison had heard about the discovery of X-rays. He set out to find the right chemicals for the fluoroscope, which was an early X-ray machine. After experimenting with about 8,000 combinations, he came up with one he liked. The fluoroscope containing this chemical combination was the one used in the first X-ray surgery performed in the United States.

41. Unidentified Photographer
X-ray of two unidentified species of birds, ca. 1950

However Edison soon realized how dangerous X-rays could be and stopped working with the fluoroscopes. Excessive radiation often led to health problems and even the death of a few of the scientists who worked closely with it. Today, we take many precautions to protect a person receiving an x-ray.

42. Josef Maria Eder
Zwei Goldfische und ein Seefisch (*Christiceps argentatus*), 1886

Roentgen was considered the father of the X-ray and even won the Nobel Prize for physics in 1901. The Nobel Prize is an internationally acclaimed prize for a discovery that advances science and technology at a rapid pace.

What is one of the most common x-rays today?

43. Dental X-ray- braces

The dental X-ray. It detects abnormal tooth growth as well as periodontal disease. The X-ray shown here was made on X-ray film manufactured by the Eastman Kodak Company. See how so many inventions are connected to each other! Eastman Kodak's X-Ray film is a special kind of film that works cooperatively with the X-ray process. How many of you have seen your own dental X-rays?