

**The idea of photography existed long before the camera was invented.**

**Since ancient times, artists and inventors have searched for ways to expedite the picturemaking process, eventually concentrating on how to automatically capture an image directly formed by light.**

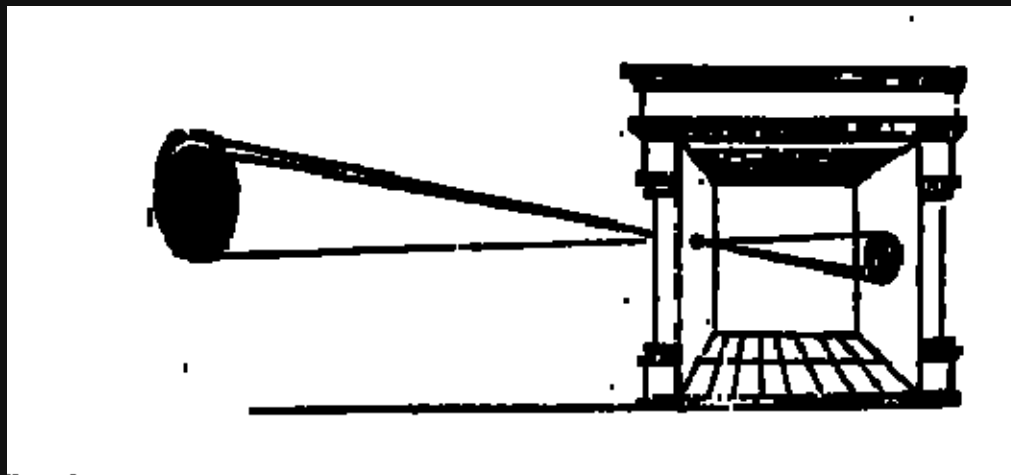
**As early as the fifth century B.C.E., the Chinese philosopher Mo Ti discovered that light reflecting from an illuminated object and passing through a pinhole into a darkened area would form an exact, but inverted, image of that object, offering a prototype of the pinhole (lensless) camera.**

**Cameras of various types have been known for centuries**

Camara obscura - The first casual reference is by Aristotle (*Problems*, ca 330 BC), who questions how the sun can make a circular image when it shines through a square hole.

Euclid's *Optics* (ca 300 BC), presupposes the camera obscura as a demonstration that light travels in straight lines. Egnacio Danti in commentary on his translation of Euclid's *Optica* (1573), adds a description of the camera obscura.

The principle of camera obscura was known 300 BC



A box or room with a small hole in the center of one of the sides or walls.

Muslim scientist  
Islamic Golden Age  
953 - 1039



Portrait of Ibn Al-Haithem from an Iraqi 10000 Dinar note.

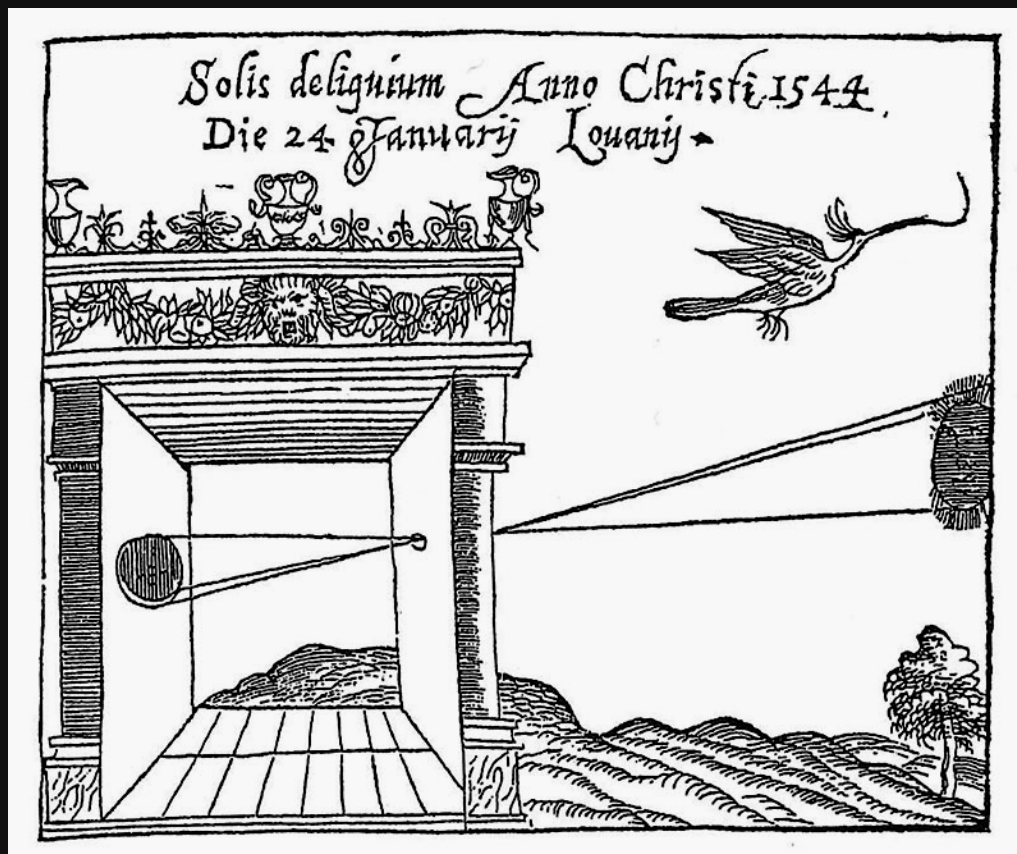
described the pinhole camera and invented the camera obscura (a precursor to the modern camera)



The camera obscura is already firmly established in Italy, with the availability of Giovanni Battista della Porta's *Magica Naturalis* (1558), based on earlier books (Cesare Caesariano's translation and commentary to Vitruvius's *Architecture* (1521), Francesco Maurolico's *Theorameta de Lumine et Umbra* (1521), Erasmus Reinhold in commentary in translation of Plubach's *Theoricae Novae Planatarum* 1542, and others).

Porta's second edition of *Magia Naturalis* (1591) includes a lens for the camera. This had been suggested earlier by Bacon, and was in use by others in the 16th century.

Porta popularized the camera obscura, which was instantly in use with astronomers: Kepler, solar observations, 1600, including the transit of Mercury in 1606; Fabricius, sunspots, 1611. Kepler coined the term "camera obscura."



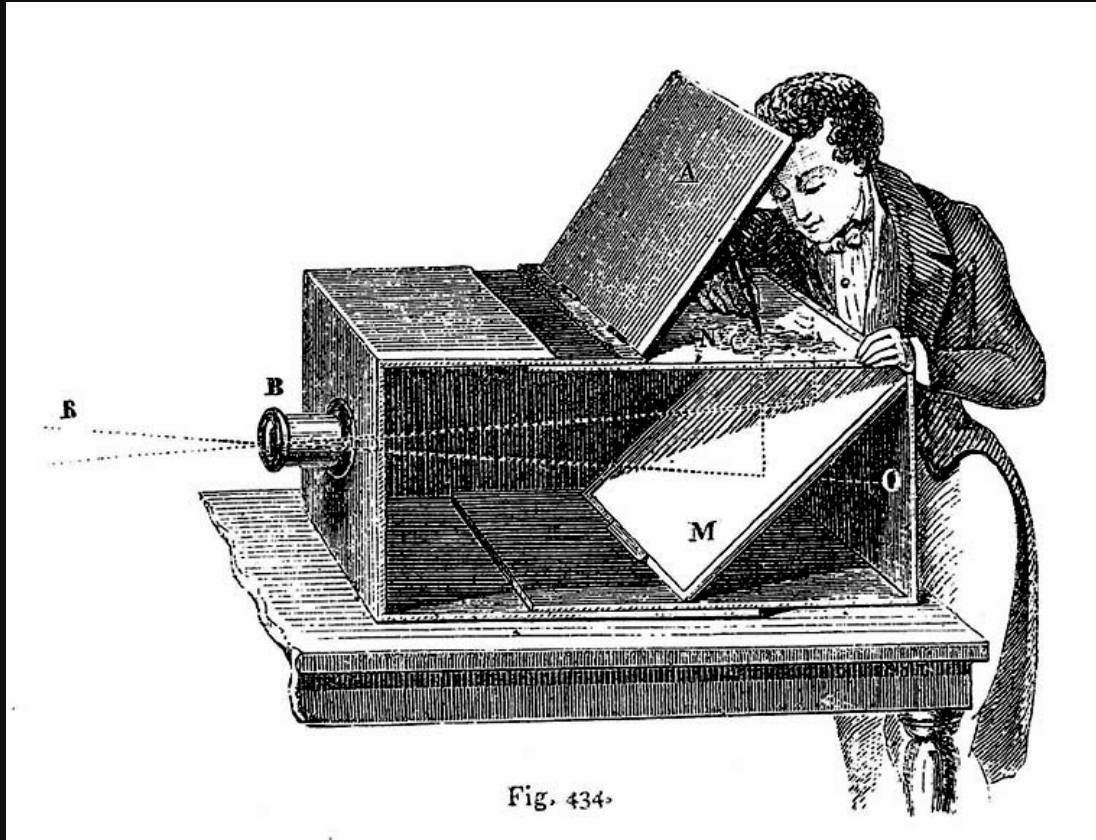
*Camera Obscura, Gemma Frisius, 1558*





● 1558

● 1568



Lens Based Camera Obscura, 1568

Reflex-box camera obscura

Johann Zahn of Germany in 1685





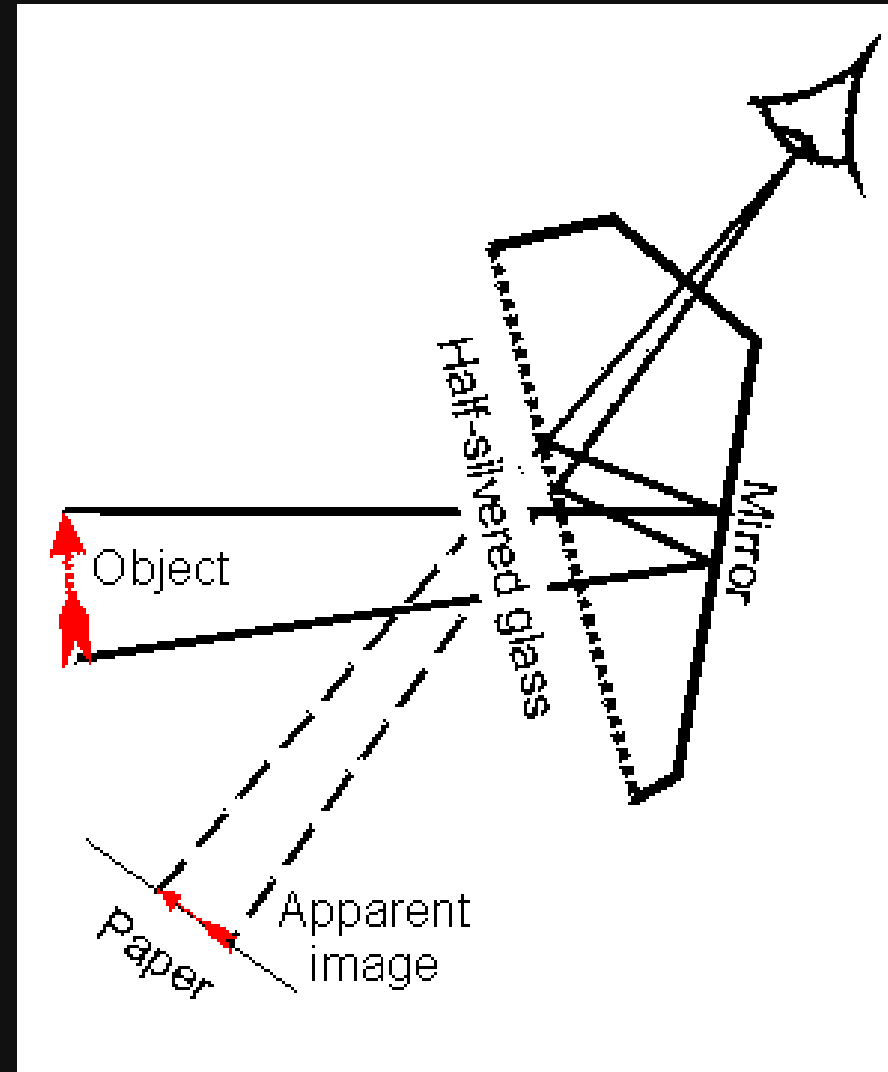
Ca. 1830 engraving of camera lucida in use.  
device clearly described by Johannes Kepler in his *Dioptrice* (1611)

patented in 1806 by William Hyde Wollaston

## How Does a Camera Lucida Work?

There are two mirrors in the 'eye piece' of a camera lucida: a normal one and a half-silvered (one-way or semi-transparent) one.

The object is reflected from first mirror onto the half-silvered one. Your eye sees this reflection and simultaneously looks through this mirror to see the paper too, so it appears that object is on the paper.

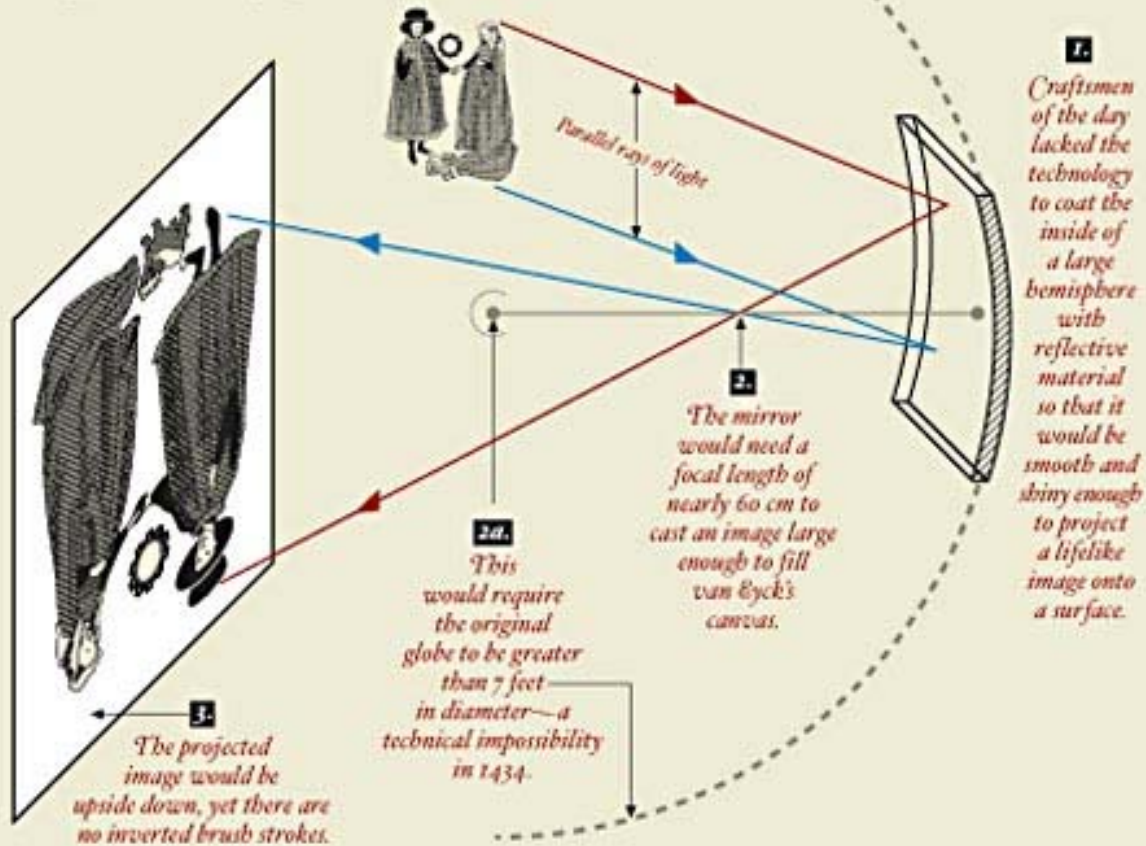




Hockney recreates one of the possible techniques employed to paint with the assistance of a concave mirror. From Hockney's *Secret Knowledge*, p. 76.

## The Concave Mirror

**Three** reasons why van Eyck probably did not use a concave mirror when he painted the *Arnolfini* portrait.





Niépce's first permanent photographic image,  
created in 1827



*Still Life, Louis Jaques Mande Daguerre, 1837*

● 1558

● 1568

● 1837

Niépce soon teamed up with Louis Daguerre, who was to become Fox Talbot's main competitor in the early development of photography.

The problem was ultimately independently solved by both L.J.M. Daguerre and William Fox Talbot.



Daguerre - Taken in 1839, this picture of a boulevard gives the impression of empty streets, because with long exposures moving objects would not register.

The main difference between the two processes Daguerre and Fox Talbot developing was that Daguerre's 'daguerreotype' process fixed a positive image on a metal plate, while Talbot's 'calotype' process produced a negative image on paper.

Daguerre officially announced his invention in 1839, and by that time the exposure time had been reduced to a couple of minutes, making it the first photographic process that could be used for portraiture.

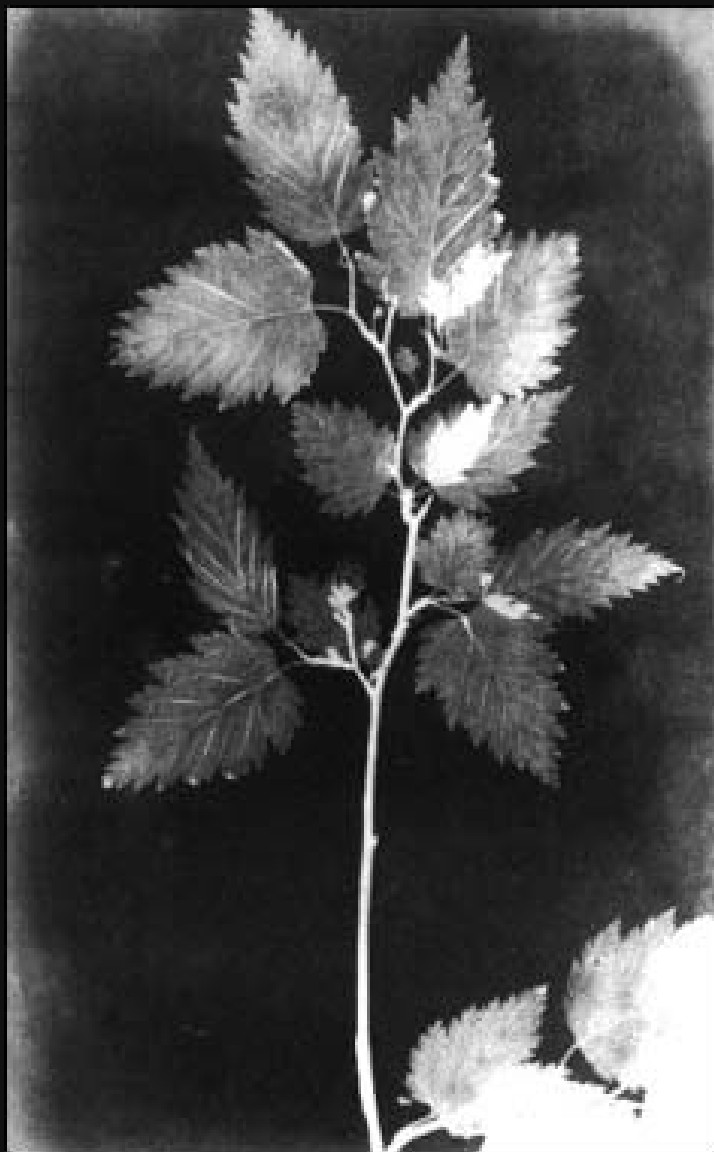
[www.cartage.org.lb/.../D/DaguerrL/daguerre.htm](http://www.cartage.org.lb/.../D/DaguerrL/daguerre.htm)



L.-J. M. Daguerre. Le Louvre vu de la rive gauche de la Seine, Paris, 1839.



*A calotype image by Fox Talbot, created in 1853*



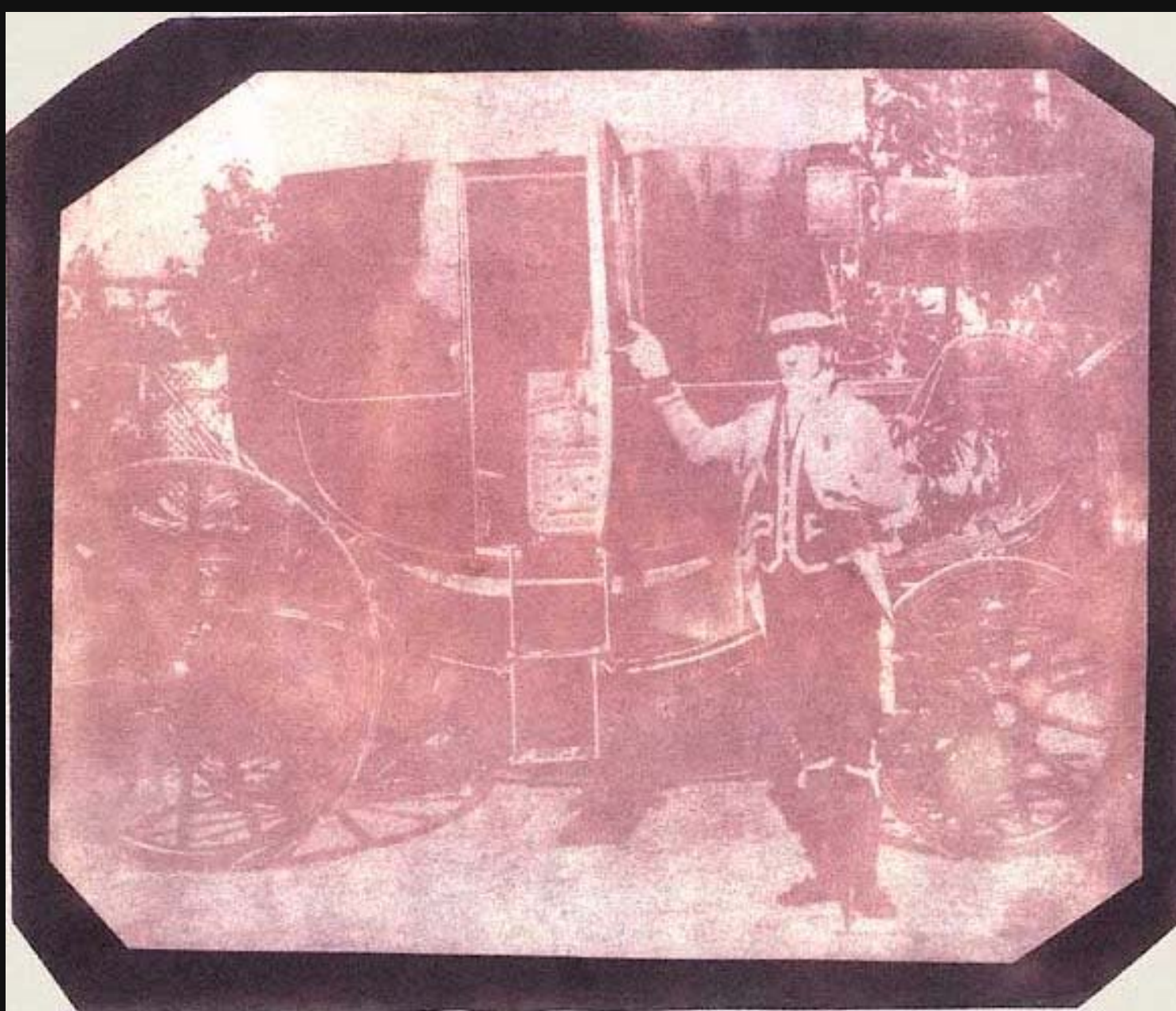
*William Henry Fox Talbot : Botanical Specimen, 1839*



*Talbot, open door, 1844*



*Talbot, abstract*



The foot man: the earliest photograph of a human figure on paper by William Henry Fox Talbot - 1840



Photograph of William Talbot (1842/43)



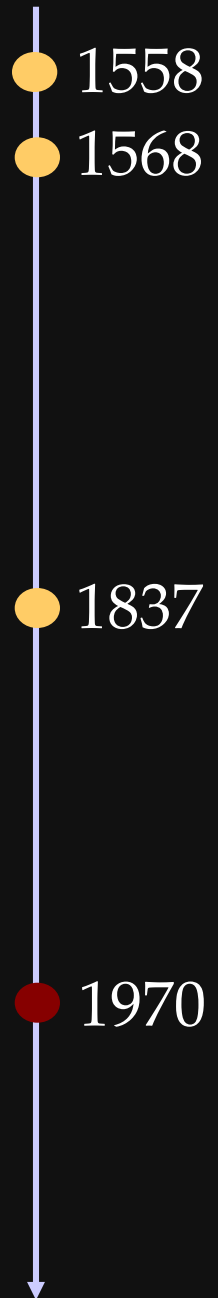
Silicon Image Detector, 1970



silicon detectors

1879 – George Eastman invented an emulsion-coating machine which enabled him to mass-produce photographic dry plates.

1885 - EASTMAN American Film was introduced - the first transparent photographic "film" as we know it today.  
♦ The company opened a wholesale office in London, England.





● 1558

● 1568

● 1837



● 1970

● 1994

Digital Cameras

# Digital camera technology digital post-processing

Photoshop replacing traditional darkroom techniques

Also replacing exposure compensation, color filtering, and other specialized shooting techniques