

“Camera Obscura” -- NOTES ON THE HISTORY OF PHOTOGRAPHY by Nora Liu

Part 1. The ancestor of all of our cameras, the *camera obscura* [Latin: dark chamber]

Creating images.....a very basic concept now. But what gave humans first the idea and impetus to make them? Although it is generally believed that the idea of images came from dreams, a very interesting suggestion was made recently by Matt Gatton<sup>1</sup>, based on the camera obscura. He suggests that cave dwellers saw upside down images of animals on the cave wall, projected from the outside of the cave by light moving through a pinhole in the hides covering the cave opening. Gatton uses an existing cave drawing of an upside-down horse to support his argument. The cave drawing is not completely convincing, but the idea is fascinating. If true, it must have been truly magical and scary to see animals moving across the rocky wall. Did these two-dimensional apparitions suggest the drawing of pictures on cave walls?



Image Source: Le Ministère de la Culture et de la Communication / The Cave Of Lascaux



<http://www.paleo-camera.com/>

<sup>1</sup> “The Camera Obscura and the Origin of Art: the case for Image Projection in the Paleolithic”, 2005

Yes, the camera obscura is still magical. I was lucky to experience this magic as a young child in Hungary. My sister and I had no TV, of course, or radio, not even children's books, but my father invented games for us. One was based on the camera obscura, for which our apartment had the perfect arrangement. We had a very bright sitting room next to a dark bathroom with no windows. The door had a large keyhole for the old-fashioned key. So my father sent one of us in the dark bathroom, with a piece of translucent paper, while the other was performing outside. It was absolutely magical to see, on the paper held up in front of my eyes, the little upside down "movie" picture (mind you – a color picture!) of my sister dancing, jumping around and singing. We loved this game, taking turns to be the receptive audience and the creative performer: dancer, actor and playwright.

I gave credit to my father for inventing this game, but he quickly told me that it was the ancient Greeks who invented it. Actually, in the 5<sup>th</sup> century BC it was the Chinese (did they invent everything?) who first mentioned the upside down images produced through a small hole.

Of course the Greeks also invented it. **Aristotle** (384 - 322 B.C.) observed the crescent shape of the partially eclipsed sun projected on the ground through the holes of a strainer, and the gaps between the leaves of a tree. He also noticed that the smaller the hole (the aperture) the sharper the image – a notion that we are very familiar with.

**Euclid (ca. 325 - 265) B.C.**, philosopher and mathematician, in his book **The Optics**, deduces that light travels in straight lines from the way the camera obscura works.

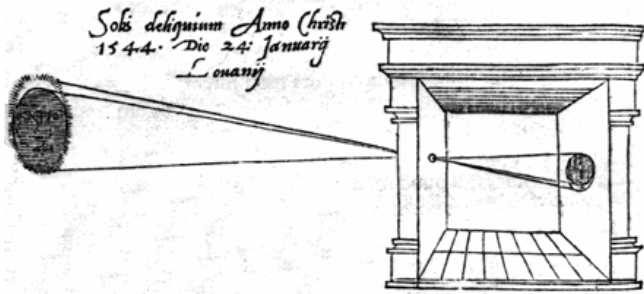
The Arabian scholar **Hassan ibn Hassan** (10th Century A.D.) described the **Camera Obscura** in his writings and stressed the significance of the relationship between the size of the aperture and the sharpness of the image.<sup>2</sup>

The Chinese, the Greeks, Arabs, and later others in Europe used the camera obscura to observe the eclipse of the sun. This drawing from 1544 shows how the camera obscura works.<sup>3</sup>

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<sup>2</sup> Eastman Kodak, Timeline for Photography

<sup>3</sup> **Camera Obscura, Reinerus Gemma-Frisius, 1544**, Gernsheim, H., [The Origins of Photography](#)



The eclipse of the sun can be viewed in a dark chamber with an aperture in the front, producing an image upside down and left to right.

Girolamo Cardano, professor of mathematics in Milan was the first to mention the use of a **lens** with a camera obscura in 1550 to sharpen the image. This caught the interest of Kepler, the astronomer, who then used the camera obscura for studying the moon's phases in a nice little contraption, which saved him from lying on the ground or breaking his neck looking at the sky!<sup>4</sup>



Portable 'Tent' Camera Obscura, Johannes Kepler (1571 - 1630), 1620

In 1558, with his publication *Natural Magic*, Giovanni Battista della Porta suggested the use of the camera obscura as a drawing tool for obtaining realistic depictions of perspective space and made the camera obscura popular. Porta was also the first to incorporate a mirror, to invert the image, making it right side up.

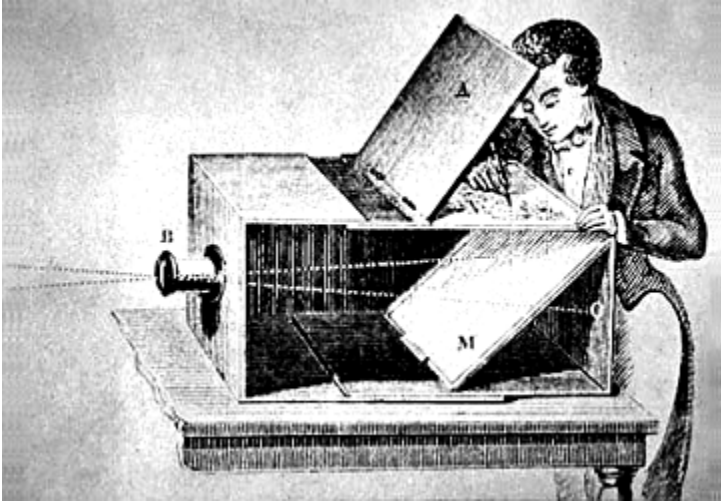
During the Renaissance, painters in Italy and later in Holland, possibly including Vermeer<sup>5</sup>, used the camera obscura for sketching. Painting nature had just begun and

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<sup>4</sup> Gernsheim, H., *The Origins of Photography*

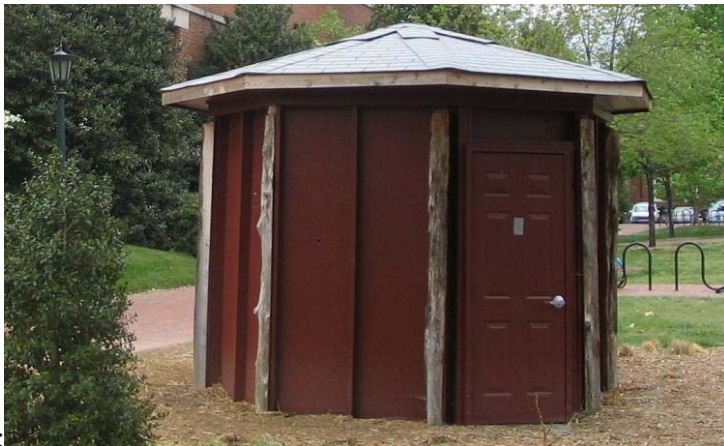
<sup>5</sup> Philip Steadman, *Vermeers's Camera Uncovering the Truth Behind the Masterpieces*

this box helped to solve the newly arisen problems of perspective. In the image below, a 45° mirror is used to invert the image, so it is no longer upside down.<sup>6</sup>



As can be seen above, a lens can be used instead of a pinhole to sharpen the image. A very highly developed glass industry in Holland created very good lenses. [Good use of these lenses was made by Leeuwenhoek, who invented the microscope using two lenses (around 1650)]

Today there are many camera obscuras that remain as tourist attractions around the world. There is a partial list of them in the Appendix. You might want to visit one on your trips. Some are pictured below.



Room-sized Camera obscura at the University of North Carolina in Chapel Hill

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<sup>6</sup> The image below has appeared in many publications



A photo of the Camera Obscura in San Francisco. This Camera Obscura is located at the Cliff House on the Pacific ocean. Credit to Jacob Appelbaum of <http://www.appelbaum.net>.

So while artists struggled and had to work very hard to produce a permanent image – painting, a sculpture - the camera obscura has been *a lot of fun* over the centuries with its fleeting images. It was just *a relatively insignificant toy* and could have remained just an *insignificant tourist attraction*. **The revolutionary and crucial step needed was to make the image permanent.** And when that happened, photography was born - a huge revolution in imaging that now permeates our lives. The philosopher, Vilhelm Flusser<sup>7</sup>, believes that the invention of photography is as important in human history as the invention of linear writing. True, today, millions of people in the world carry a little camera obscura in their pocket, in cell phones, Blackberries, amazing little digital cameras, and are bombarded by countless images all day. We could not live without it. How did this happen? Read it next month!!!<sup>8 9</sup>

## Appendix

Camera obscura tourist attractions:

- [Turin](#) in Italy
- [Edinburgh](#) in Scotland
- [Johannesburg](#) in South Africa
- [Pretoria](#) in South Africa
- the [Observatory](#) in [Bristol](#)
- [Kentwell Hall](#), [Long Melford](#), [Suffolk](#), England
- [Aberystwyth](#) and [Portmeirion](#) in [Wales](#)
- [Kirriemuir](#), [Dumfries](#) and [Edinburgh](#) in Scotland
- [Dumfries Museum and Camera Obscura](#), [Scotland](#)

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<sup>7</sup> Villem Flusser; The Philosophy of Photography

<sup>8</sup> Beaumont Newhall, The History of Photography The Museum of Modern Art, New York

<sup>9</sup> Martin W. Sandler, Photography- An Illustrated Story

- [Trondheim, Norway](#)
- [Lisbon](#) and [Tavira](#) in [Portugal](#)
- [Santa Monica, California](#) at [Pacific Palisades Park](#)
- [Los Angeles](#) at the [Griffith Observatory](#)
- [San Francisco, California's Camera Obscura](#)
- [North Carolina's "Cloud Chamber for the Trees and Sky"](#)
- [Eger](#) in [Hungary](#)
- [Cádiz](#) in [Spain](#) in the [Torre Tavira](#)
- [Royal Observatory, Greenwich, London](#)
- [Perdika](#) , [Aegina Island, Greece.](#)
- [Marburg , Universitie of Physik, Germany](#)
- [The Science Museum of Minnesota, St. Paul](#)
- [Greenport on Long Island, New York](#)

[http://en.wikipedia.org/wiki/Camera\\_obscura](http://en.wikipedia.org/wiki/Camera_obscura)