The Hockney thesis and the history of optical projection

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Abstract: David Hockney's recent book *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters*, argues that 15th century painters employed optical devices to achieve realistic portraiture. A reexamination of the history of optical projection techniques raises problems for Hockney's thesis.

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David Hockney and Charles Falco have suggested that painters from Jan van Eyck to Jean-Auguste-Dominique Ingres may have achieved a remarkable imitation of nature not through sheer painterly talent, but by using optical devices [1] [2]. While the use of a wide variety of optical devices and instruments by artists had been documented extensively by historians prior to the publication of Hockney's book, the originality of the thesis lies in attributing the sudden increase of naturalism visible in portraiture from the 1430s to the use of a new instrument: the concave mirror camera obscura to project brightly lit subjects onto a canvas. Later, at around the end of the sixteenth century, according to Hockney's chronology, painters including Caravaggio began to use refractive lenses instead of concave mirrors to project their images for tracing.

New evidence concerning the history of optical projection challenges Hockney's hypothesis [3] [4]. In particular, a close reading of the historical documents suggests that the specific device that Hockney and Falco claim was used widely by artists from the 1430s was in fact invented by the Neapolitan magician Giambattista della Porta. In 1558, Della Porta gave the earliest description of a new type of camera obscura in the first edition of his widely read book *Natural Magic* [5]. The technique involved using a concave mirror to project an inverted image onto a piece of paper. This is the first documented account of the device that Hockney and Falco claim was used by artists from the 1430s. In the expanded second edition of *Natural Magic*, published in 1589, della Porta combined a convex lens with his concave-mirror projection system to produce a device that projected large, upright images.

At best, the device that Hockney claims was used by artists from the 1430s had perhaps a 35-year working life as an artist's instrument over 100 years later, assuming that it was not just an amusing toy for those unable to draw, as della Porta himself suggests. If Caravaggio used a camera obscura, he would have had every opportunity to avail himself of the latest technology — della Porta's combined convex lens and concave mirror, an instrument that goes unmentioned in Hockney's book. If fifteenth-century painters used the camera obscura, however, then they used a simple hole in the wall: no mirror, no lens.

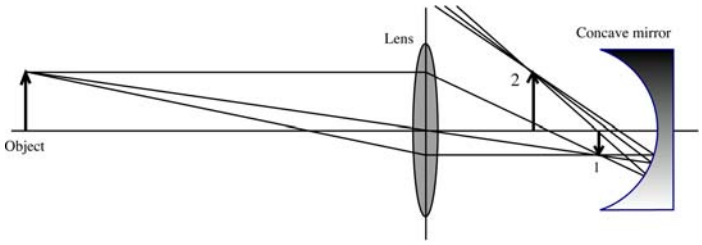

Fig. 1. Della Porta's 1589 projection system, producing an upright image at 2.

References:

1. D. Hockney, *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters*, Penguin-Putnam, 2001.
2. D. Hockney and C. Falco, *Optics and Photonics News* (2000)
3. M.J. Gorman, *Nature*, **417**, 794 (2002).
4. M.J. Gorman, *Leonardo*, **36**, 295-301 (2003).
5. Giambattista della Porta, *Magiae naturalis ... Libri IIII*, Naples, Matthias Cancer (1558).