

Evidence for mechanical (not optical) copying and enlarging in Jan van Eyck's *Portrait of Niccolò Albergati*

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Abstract: We review Ketelsen et al.'s discovery of tiny pinprick holes in Jan van Eyck's silverpoint study portrait of Niccolò Albergati(?), which indicate mechanical copying such as by a *Reductionszirkel* or *Proportionalzirkel*, rather than by an optical epidiascope. We "re-enact" copying by *Reductionszirkel* and find (sub-millimeter) fidelity equal to that in van Eyck's work. We show that Renaissance artists would face significant challenges making and using an epidiascope, which finds no documentary support, including none from scientists, artists or patrons.

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Recently it has been claimed that Jan van Eyck copied and enlarged a silverpoint study of *Portrait of Cardinal Niccolò Albergati* (1432) by means of a concave mirror-based epidiascope or simple opaque projector [1]. The discovery of pinprick holes on the silverpoint's contours strongly suggests the reproduction involved *mechanical* (not optical) aids, e.g., a *Reductionszirkel* [2], known from Roman times. Richard Taylor "re-enacted" copying by *Reductionszirkel* and easily achieved sub-millimeter fidelity. The two "relative offsets" in van Eyck's work are better explained as arising from mechanical than from optical sources. There are many difficulties in optical copying [3], and no 15th-century documentary evidence for epidiascopes or appropriate projections onto screens.

Figure 1: A *Reductionszirkel* comprises two pointed sticks, the pivot position determines the copy enlargement factor (left). An artist spreads two tips, guided by the original, then inverts the device and marks the enlarged copy with the opposite tips (center). Our 40% enlarged copy, reduced in software and overlapped with an original, shows sub-millimeter fidelity (right).



We therefore reject the claim the *Albergati* copy in oil was made using projections.

References:

1. David Hockney, *Secret Knowledge* (Viking, 2001); Charles Falco, CBS "60 minutes," December, 2002
2. Thomas Ketelsen, Olaf Simon, Ina Reiche & Silke Merchel, "Als Ixh Xan, Sum zeichnerischen Kalkül Jan van Eycks: New insights by a co-operation between natural science and the history of art," *Burlington Magazine*, 2004 (in press)
3. David G. Stork, "Did Jan van Eyck build the first 'photocopier' in 1432?" *SPIE Electronic Imaging, Color Imaging IX: Processing, Hardcopy, and Applications*, R. Escbach and G. G. Marcu (eds.) 50-56, 2004.