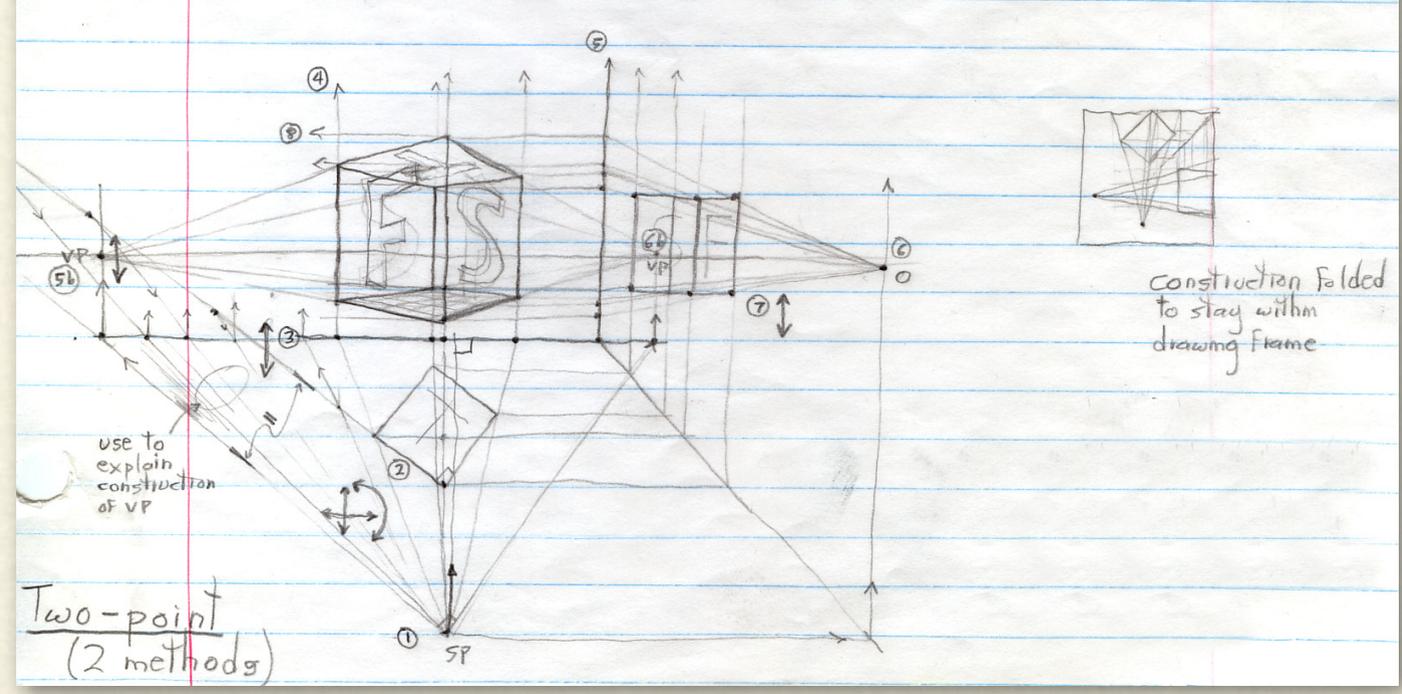
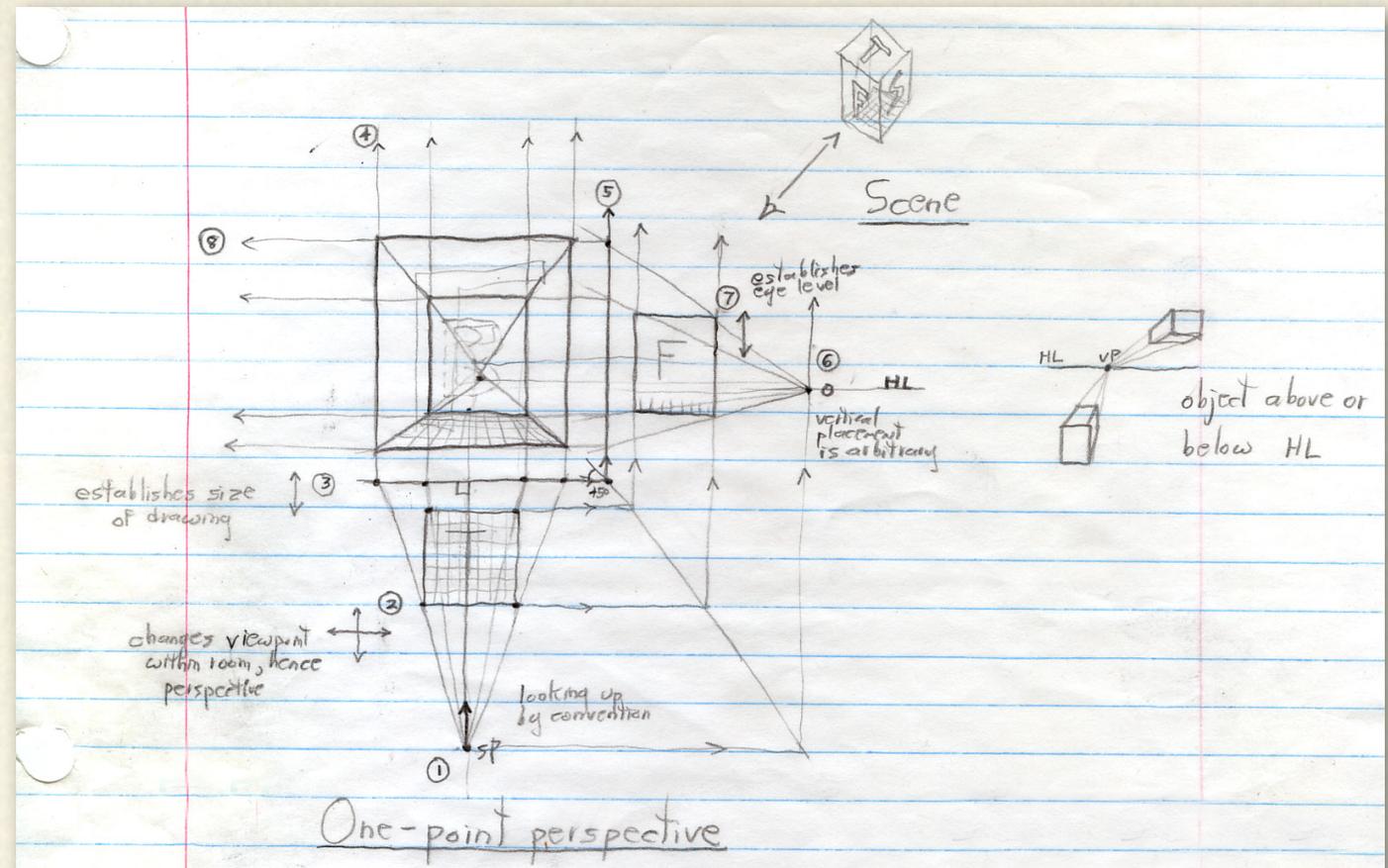


The geometry of perspective

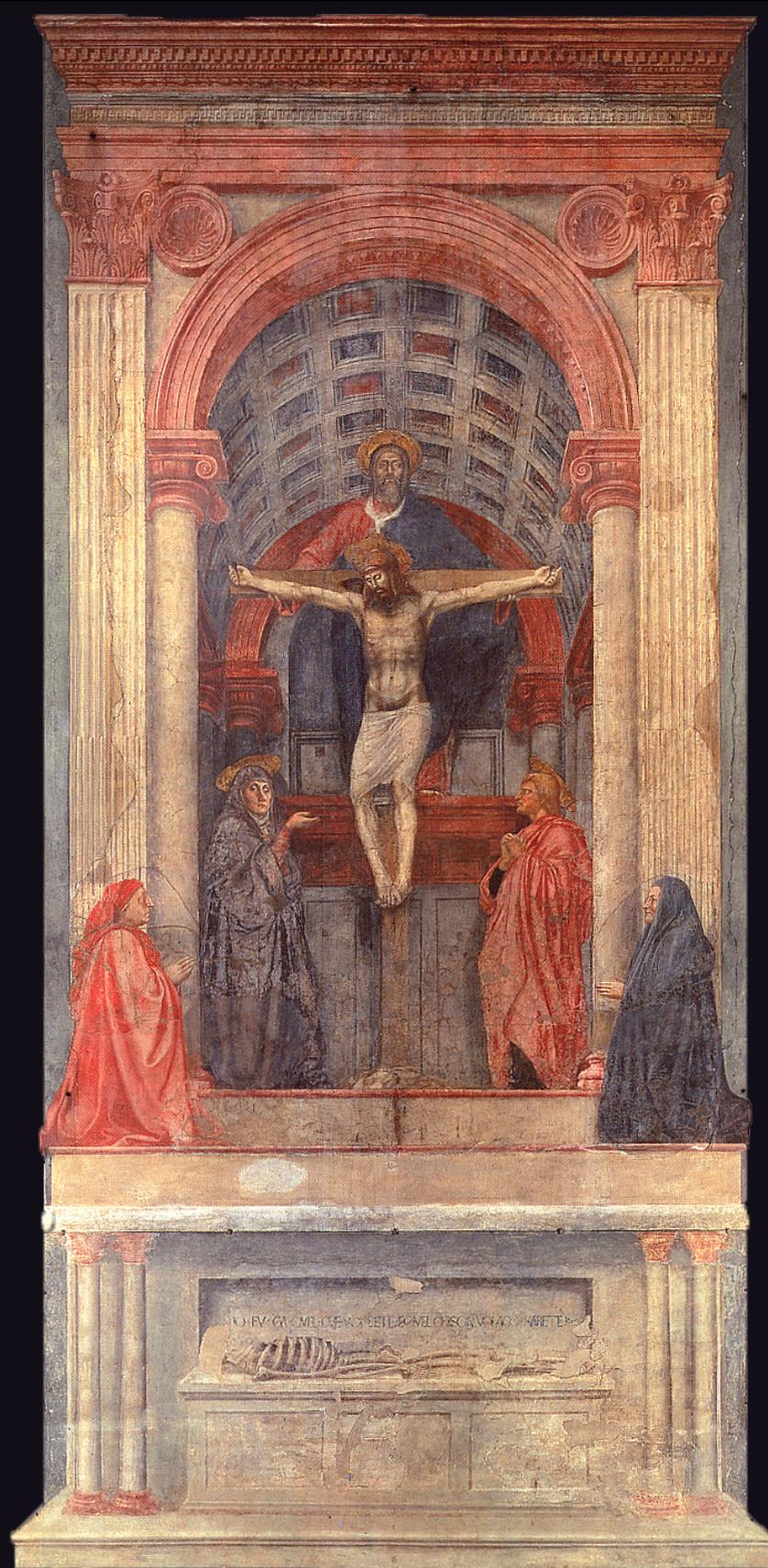
CS 48N, Winter 2011



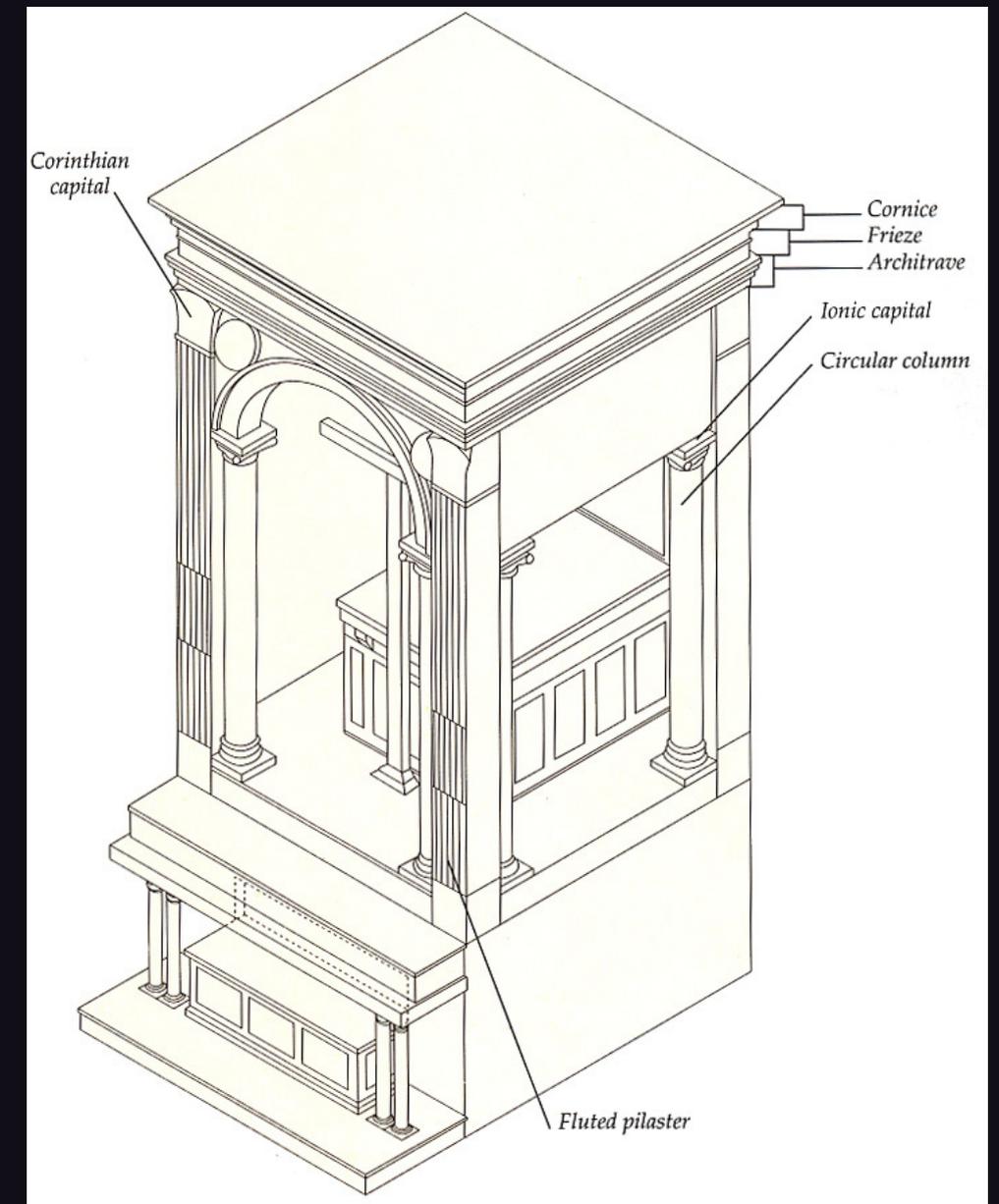
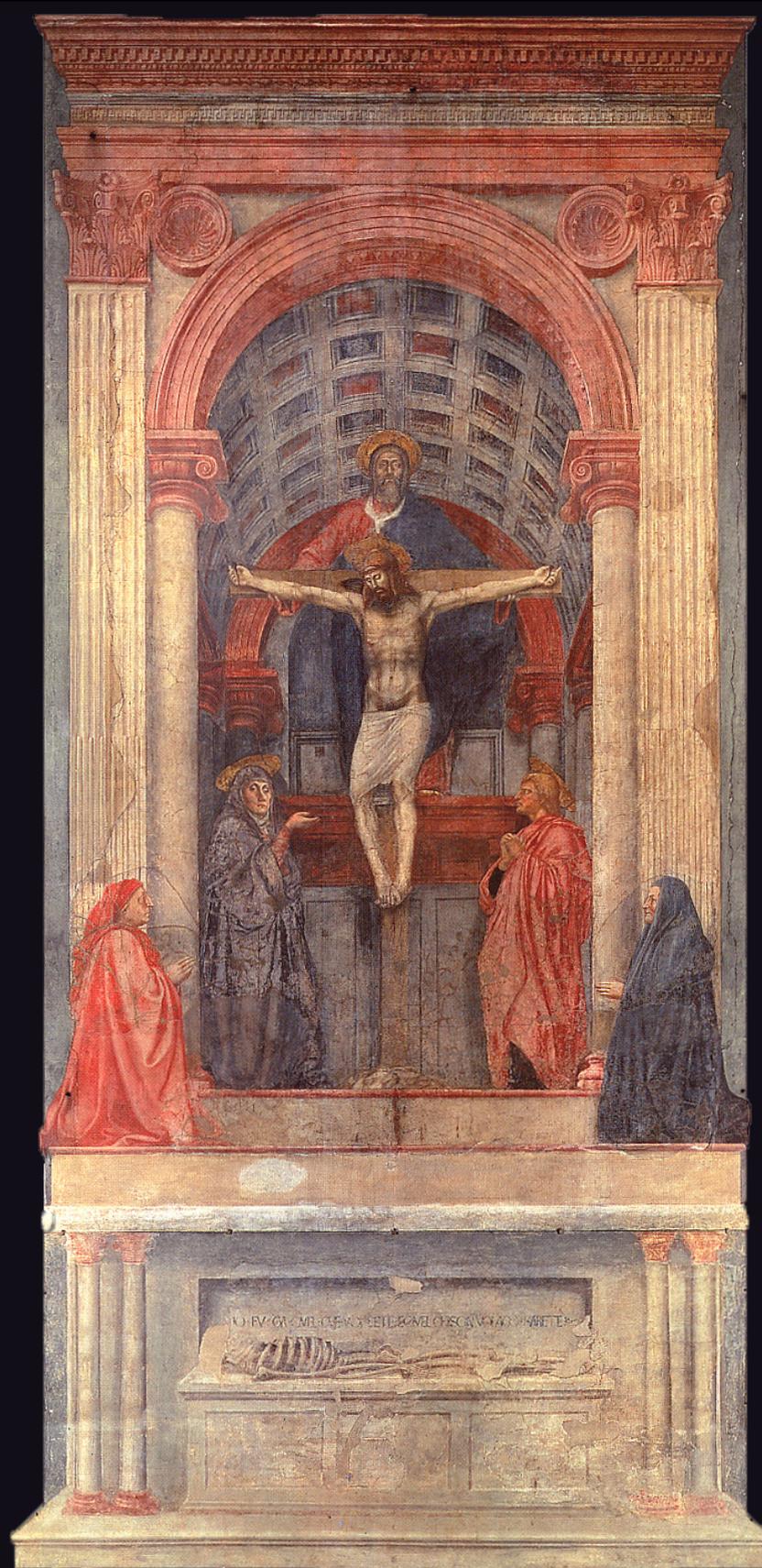
Marc Levoy
Computer Science Department
Stanford University



Masaccio
Holy Trinity
Santa Maria Novella
Florence (1428)



Masaccio
Holy Trinity
Santa Maria Novella
Florence (1428)

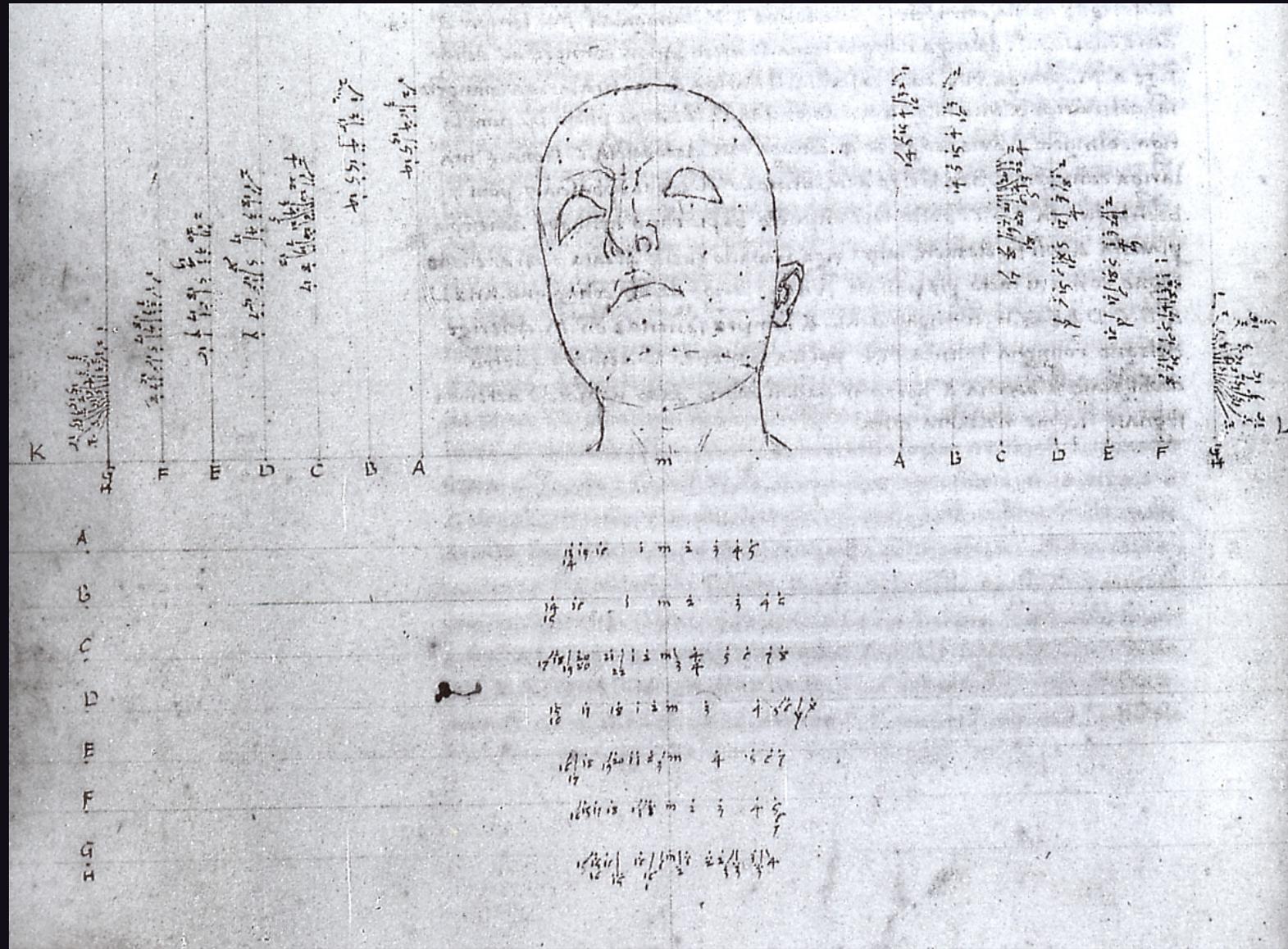


3D reconstruction

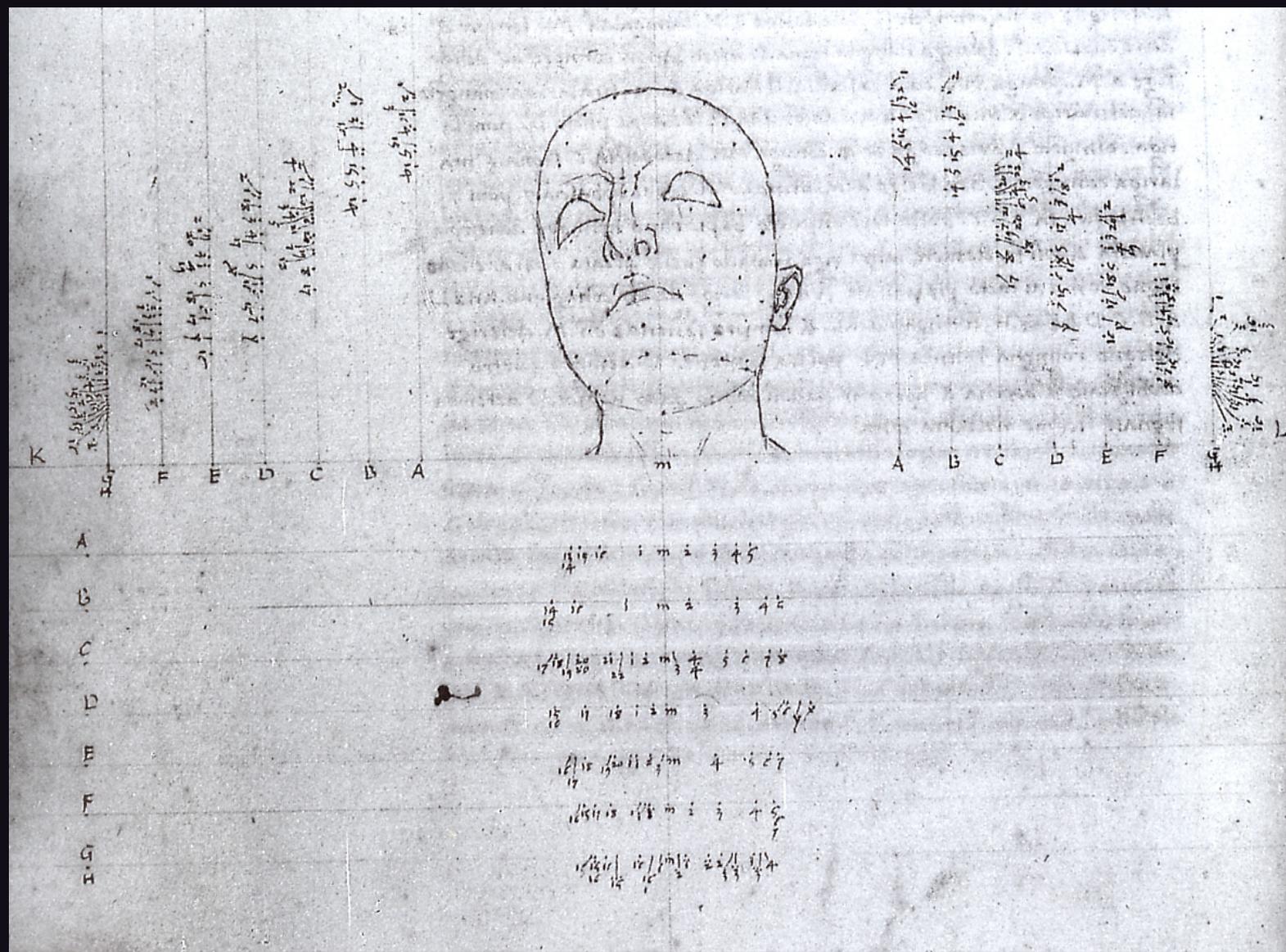
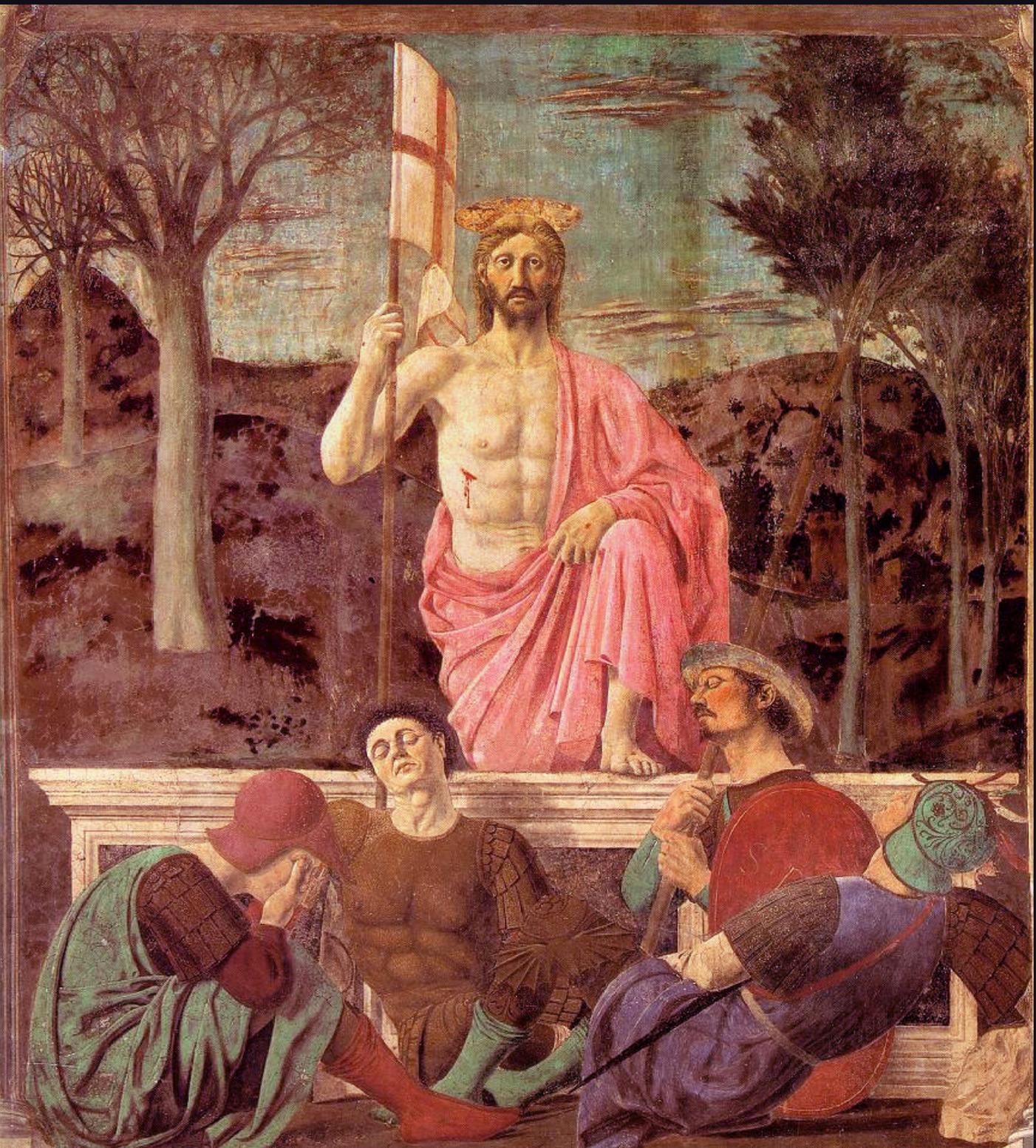




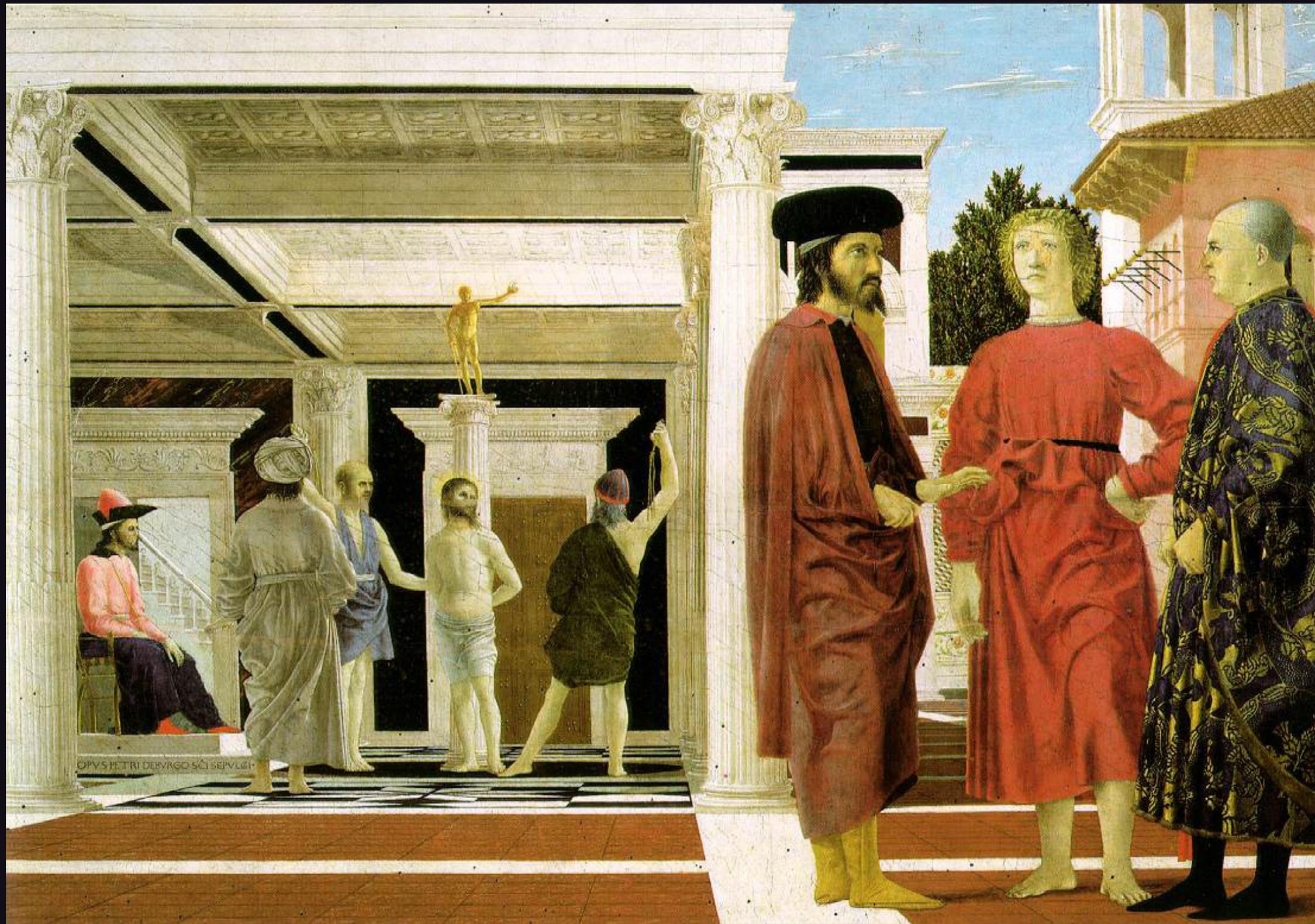
Piero della Francesca, De prospectiva pingendi (1474)



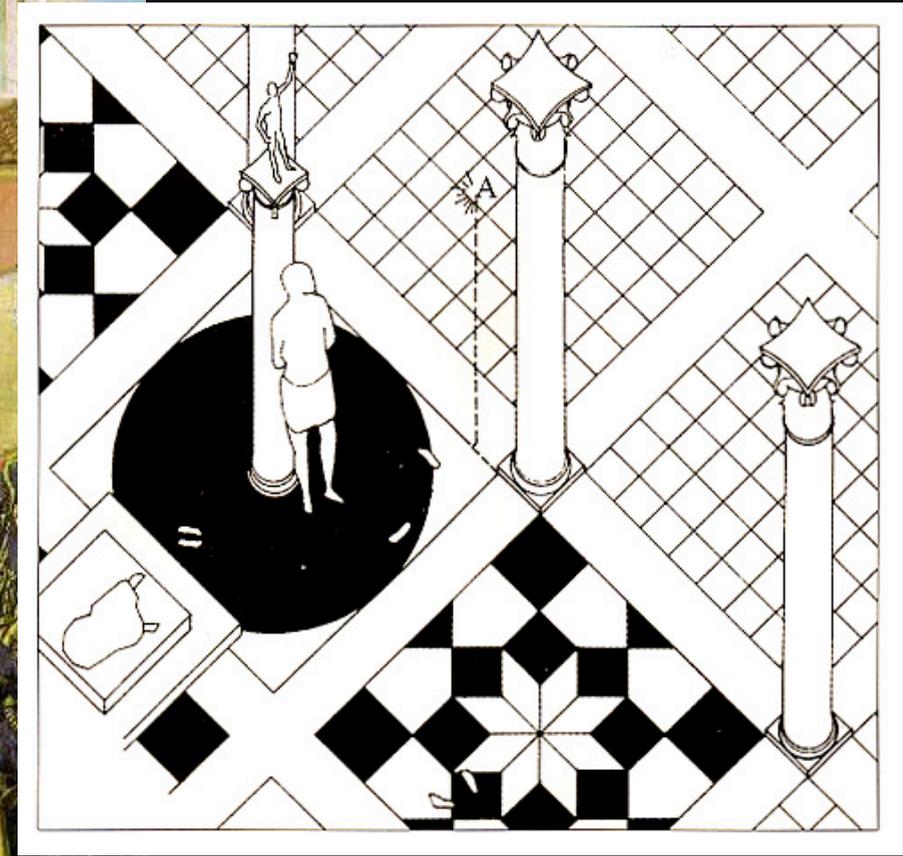
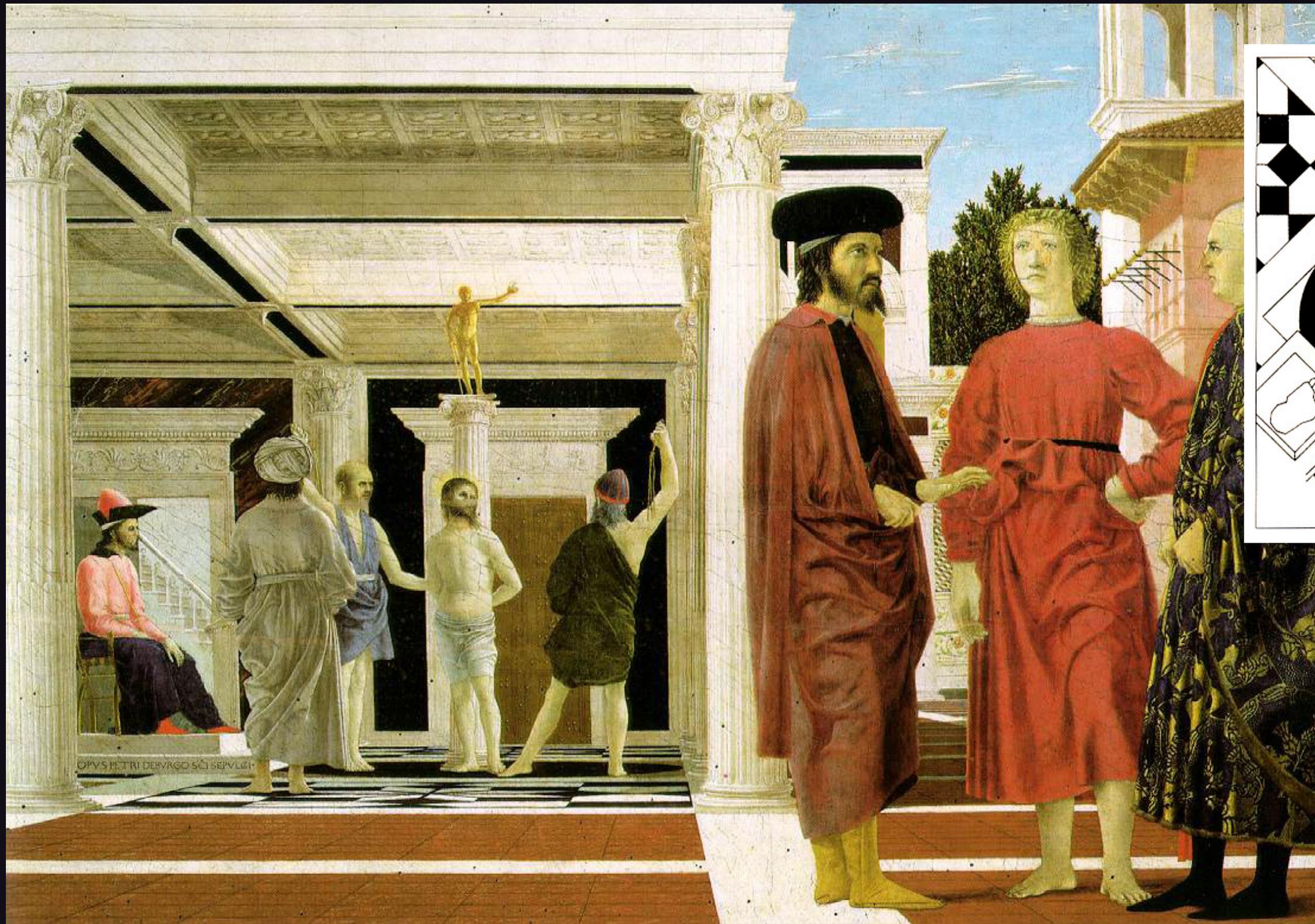
Piero della Francesca, De prospectiva pingendi (1474)



Piero della Francesca, Resurrection of Christ (1474)



Piero della Francesca, Flagellation of Christ (1474)



3D reconstruction

Piero della Francesca, Flagellation of Christ (1474)

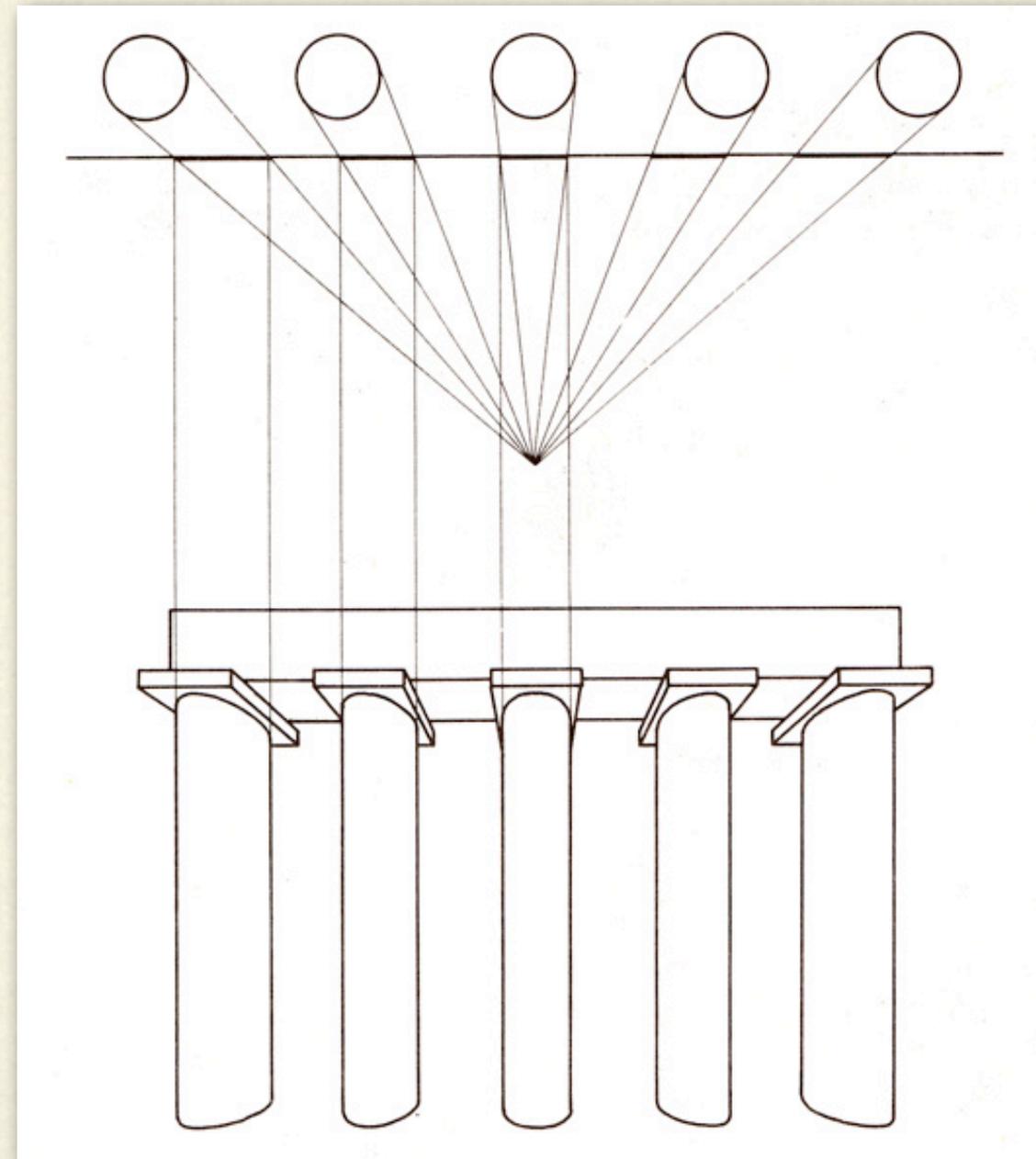
Andrea Mantegna
Ceiling, Palazzo Ducale
Mantua (1474)



Andrea Mantegna
Dead Christ
(1474)



Q. Why does this perspective drawing look distorted?



(drawing from Dubery)

Solutions to the wrong-viewpoint problem

0a: enforce the viewpoint, e.g. using a peephole

Solutions to the wrong-viewpoint problem

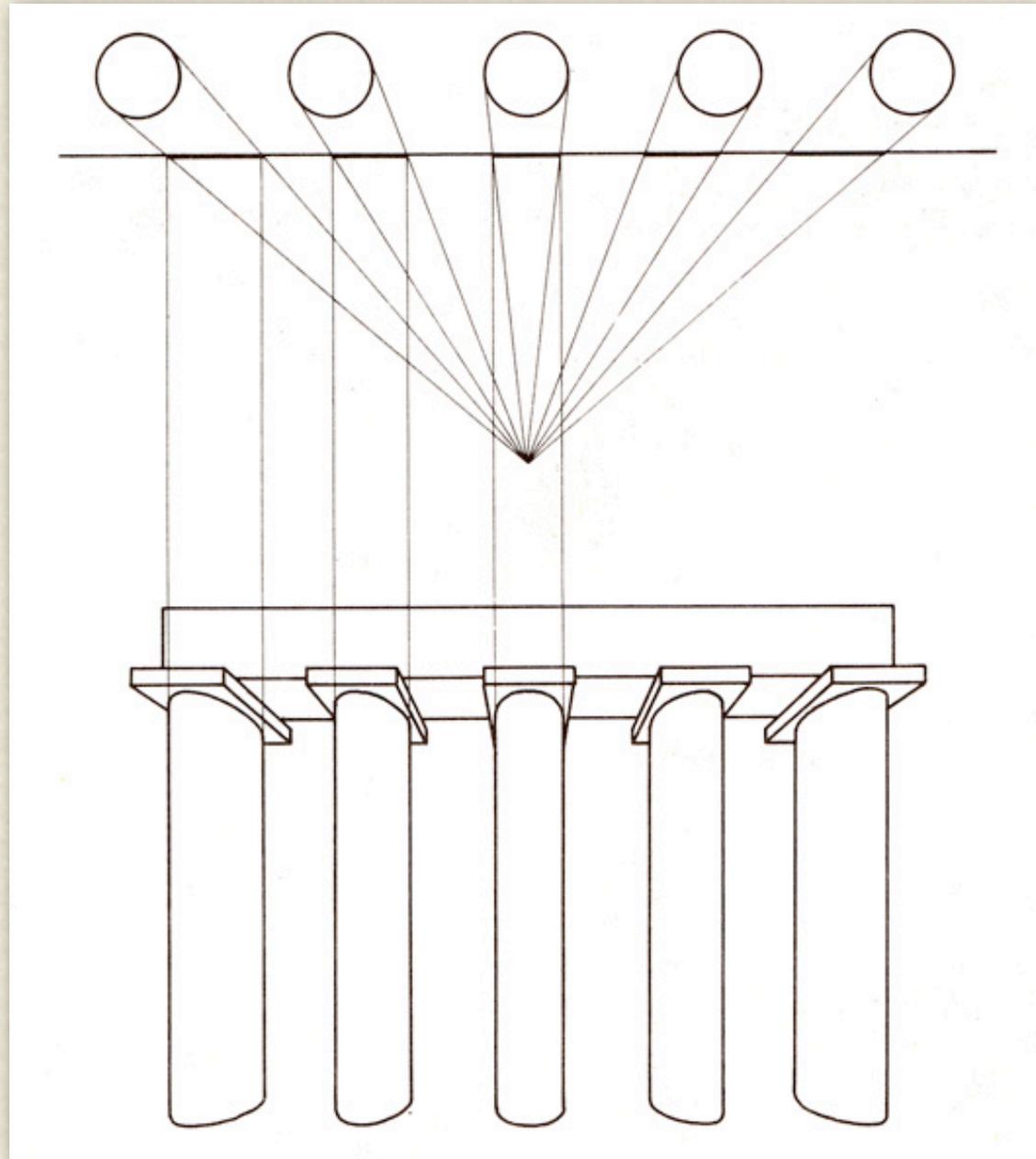
0a: enforce the viewpoint, e.g. using a peephole

0b: enjoy the distortions!

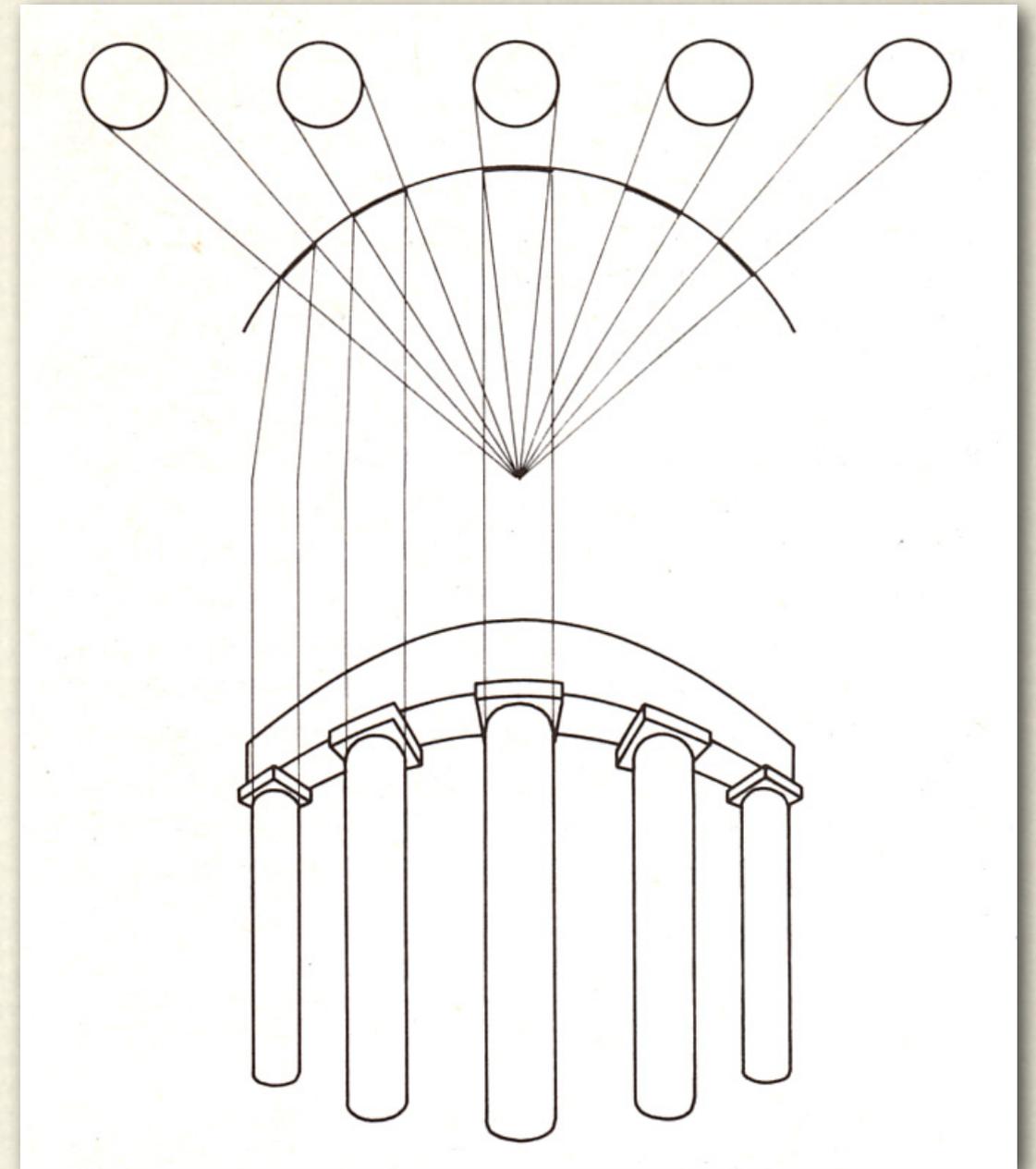


Van Gogh, Vincent's Room (1888)

Planar versus cylindrical projection



planar



cylindrical

Solutions to the wrong-viewpoint problem

0a: enforce the viewpoint, e.g. using a peephole

0b: enjoy the distortions!

1: narrower angle of view



Caravaggio, Supper at Emaus (1601)



Mughal miniature (c. 1605)

Solutions to the wrong-viewpoint problem

0a: enforce the viewpoint, e.g. using a peephole

0b: enjoy the distortions!

1: narrower angle of view

2: shallower range of depths



Canaletto, Venice: The Feast of St. Roch (1727)

Solutions to the wrong-viewpoint problem

0a: enforce the viewpoint, e.g. using a peephole

0b: enjoy the distortions!

1: narrower angle of view

2: shallower range of depths

3: multi-perspective



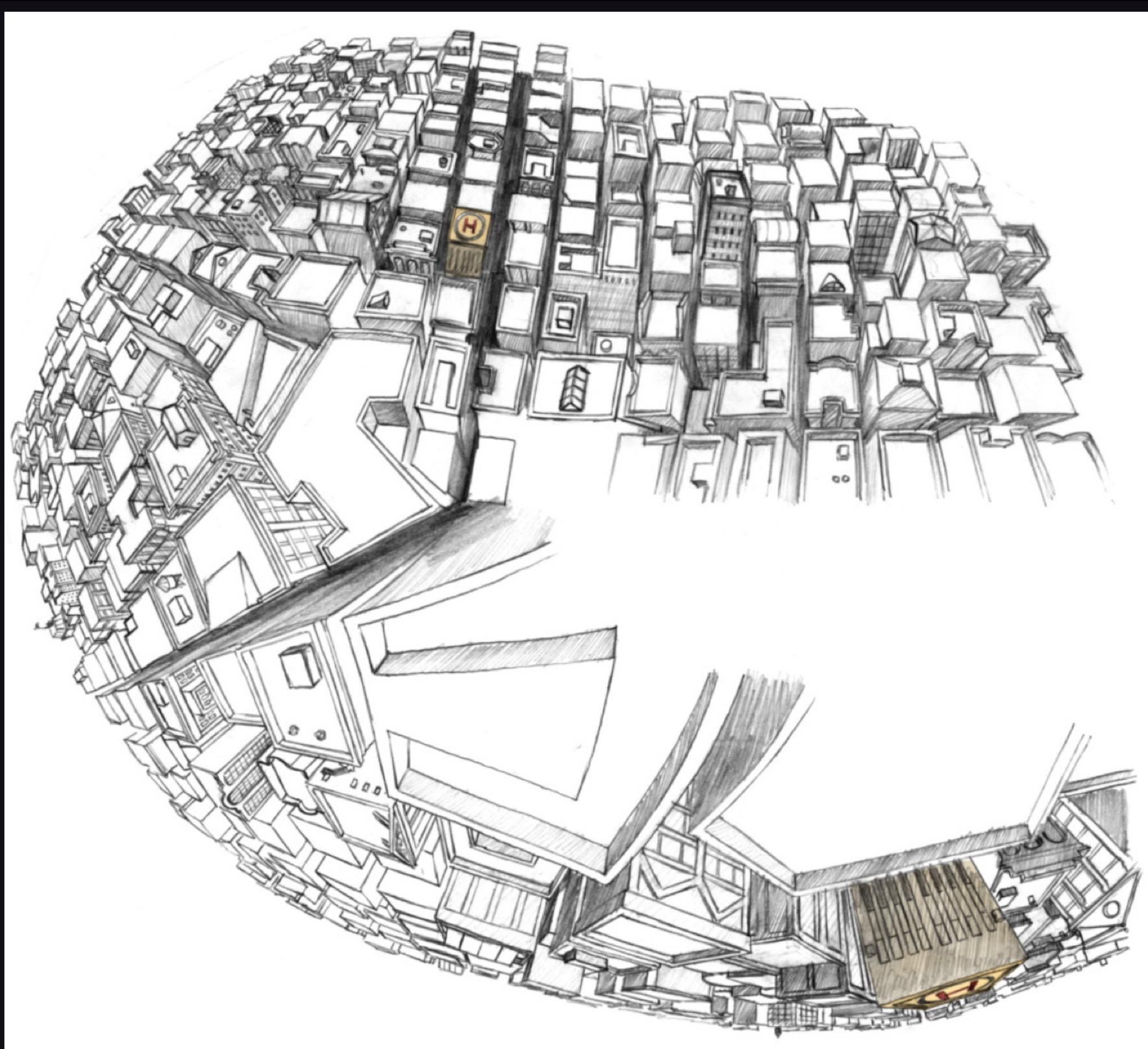
Raphael, The School of Athens (1511)





Walt Disney, opening panorama from Pinocchio (1940)





Wood et al., Multiperspective Panoramas for Cel Animation, Proc. Siggraph 1997