More on Perspective Projection

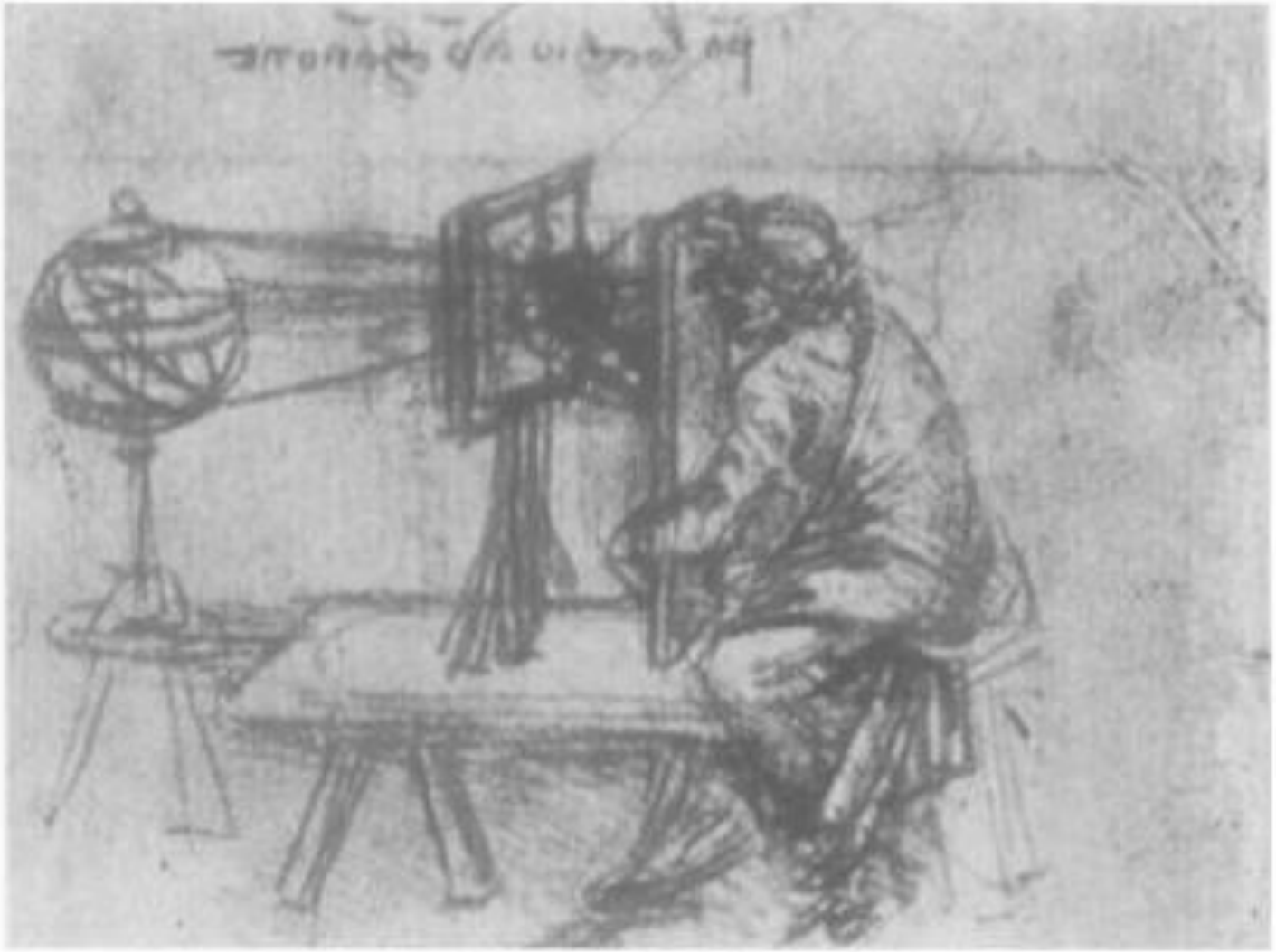


Figure 2.1. Leonardo's technique for making a perspectival drawing of the sphere of the macrocosm (CA 1 ra bis).

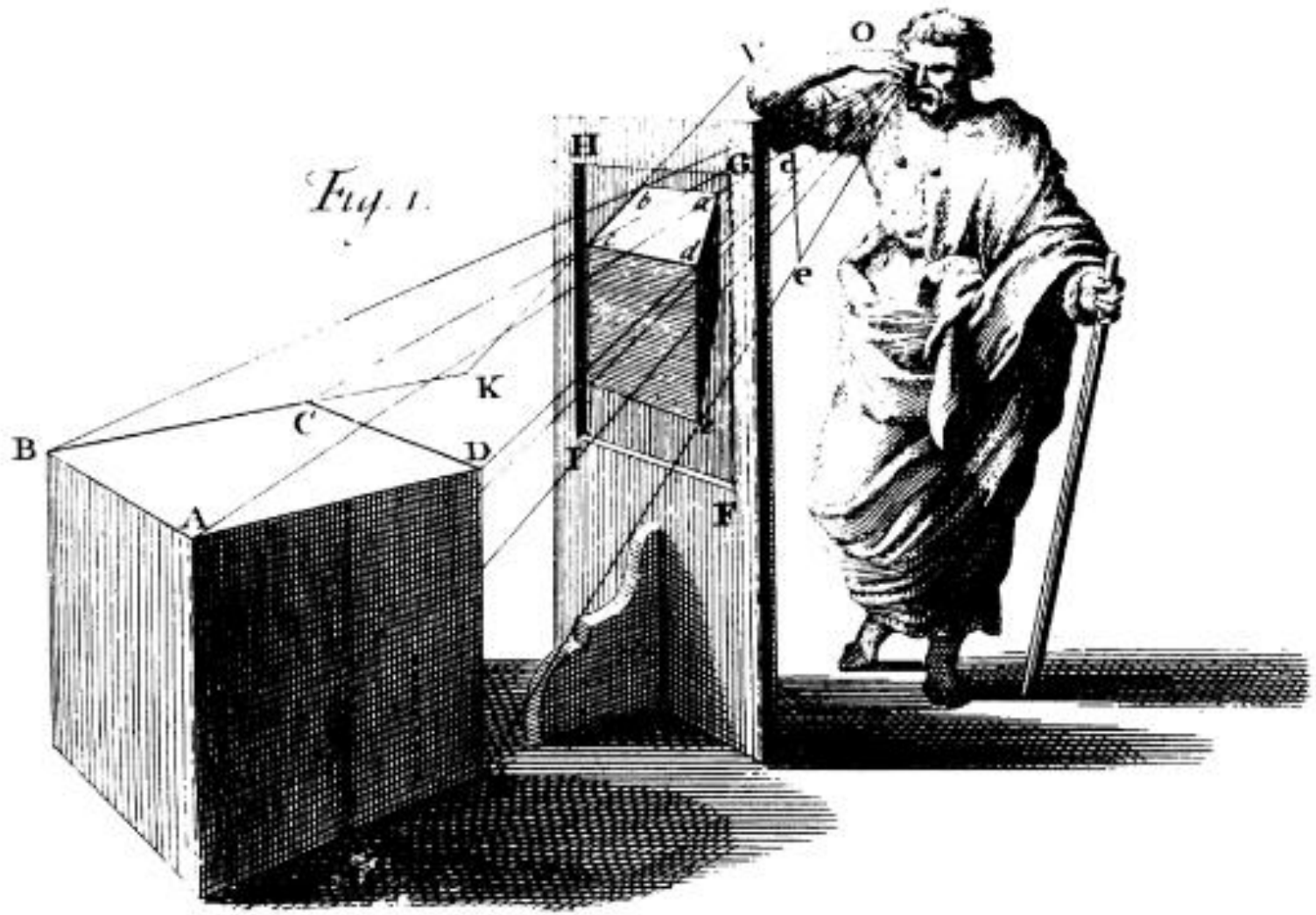


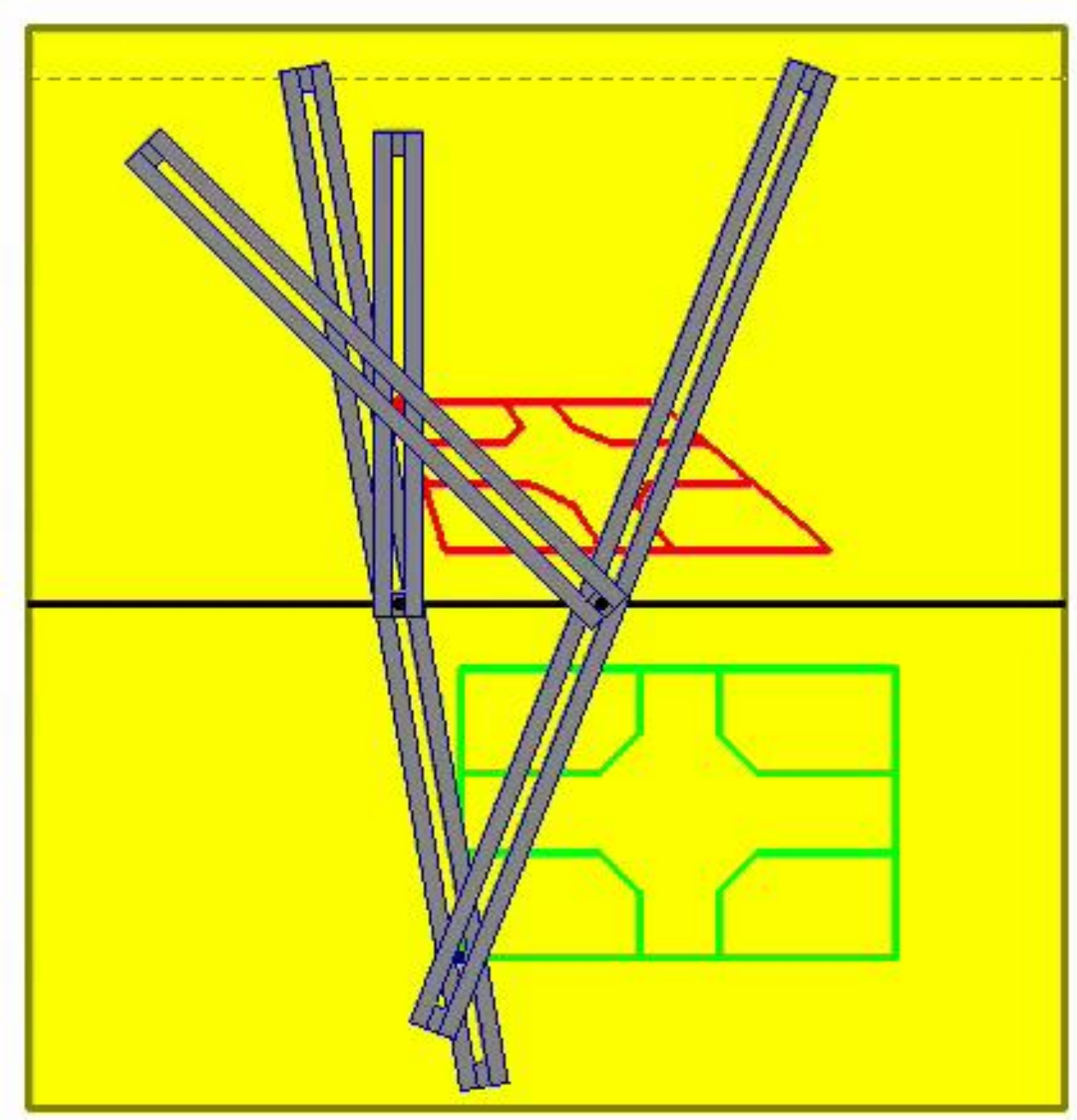
Fig. 1.
O
V
H
G
b
a
d
c
e
K
C
D
B
A
I
F

Bi-perspectograph 1752

LAMBERT'S TWO-DIMENSIONAL PERSPECTOGRAPH (1).

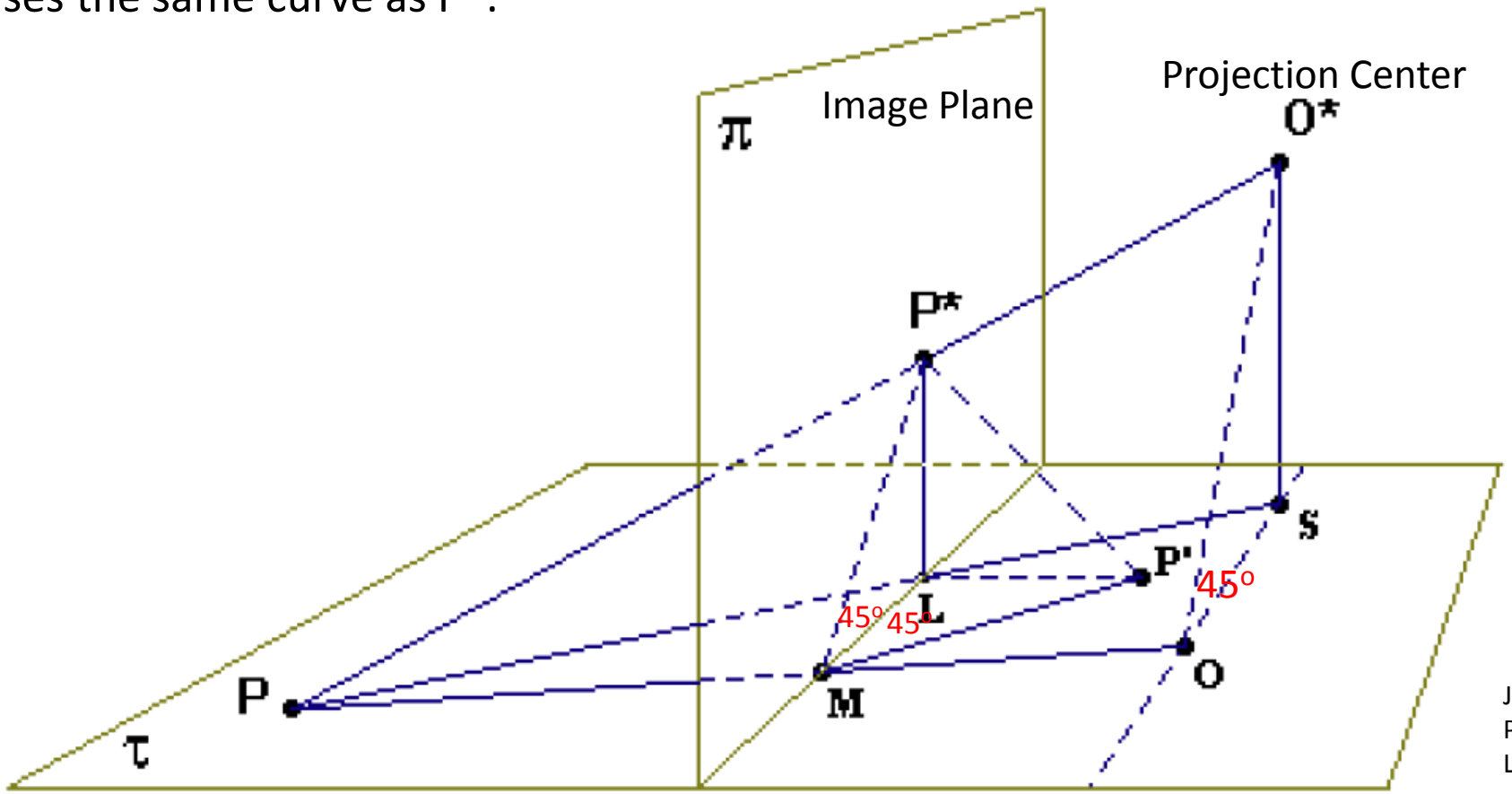
(From: J. H. Lambert, "*Anlage zur Perspektive*", manuscript, August 1752; "*Essai sur la Perspective*", edizione Peiffer – Laurent, 1981)

Mechanical realization



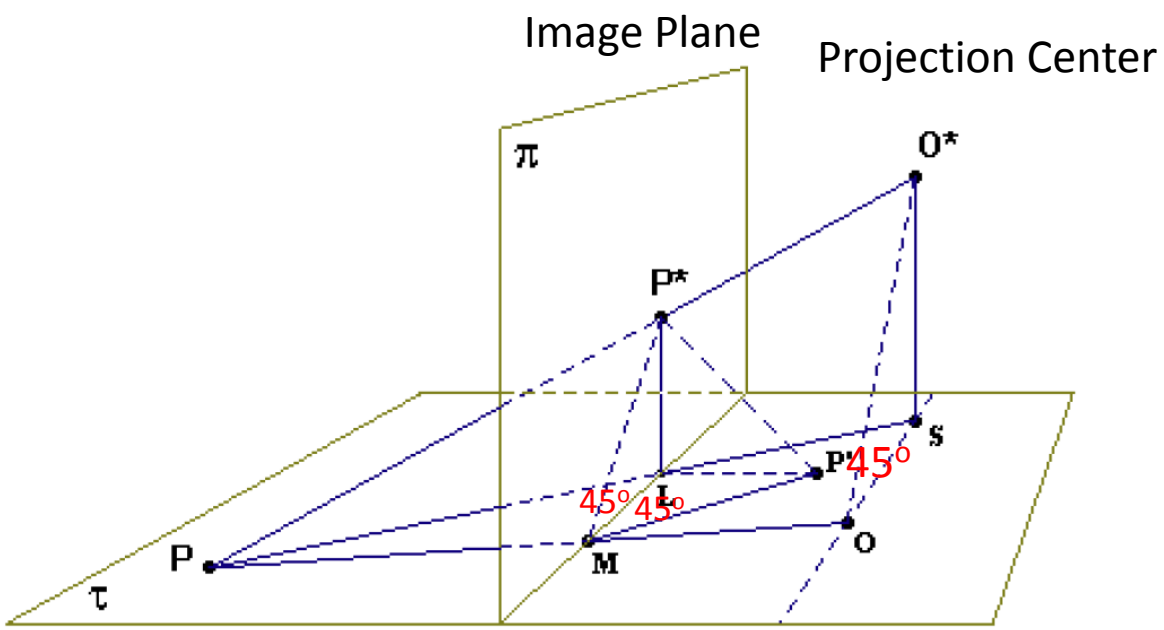
Geometric explanation of bi-perspectograph:

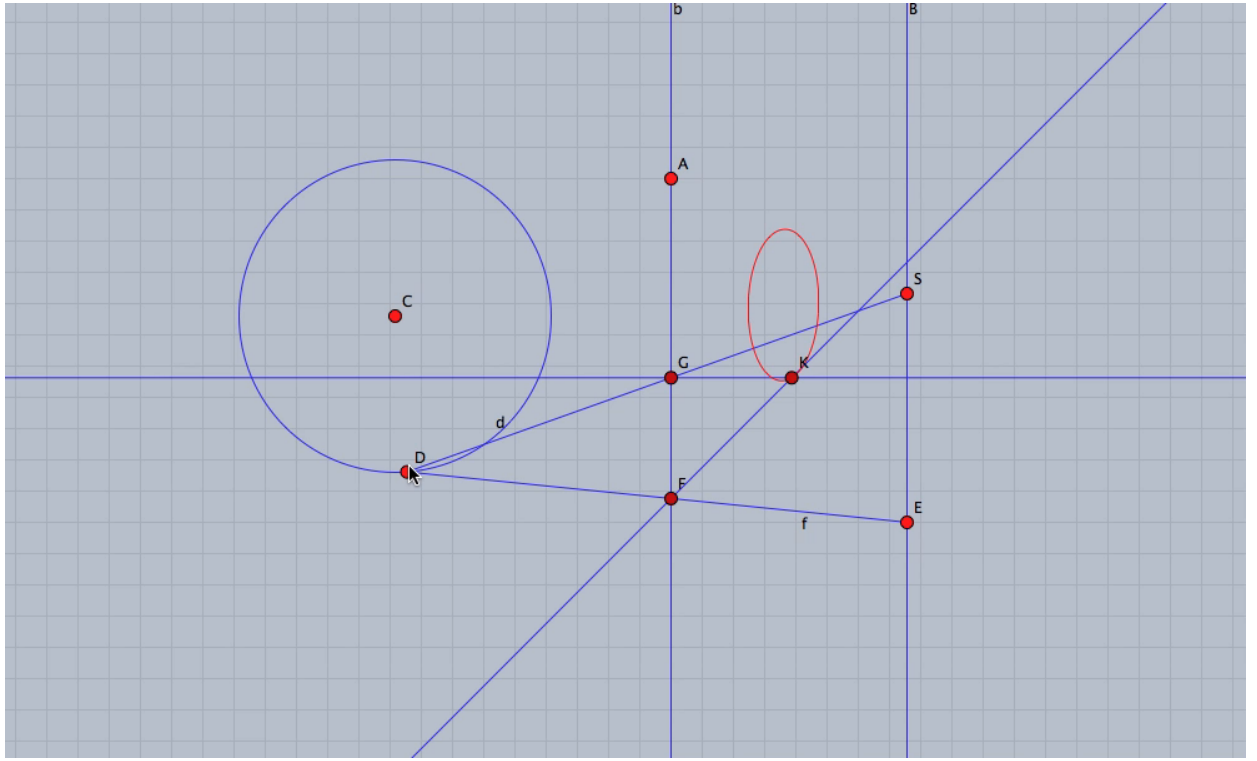
How can we draw a congruent copy of the image plane on the ground plane?
Select O such that OS=SO*. This means angle SOO*=45° and hence angle LMP* is 45° as well.
Draw line at L perpendicular to LM. Draw line at M with fixed angle 45°. Call their intersection P'. Then triangle P*LM is congruent to P'LM.
Hence, P' traverses the same curve as P*.



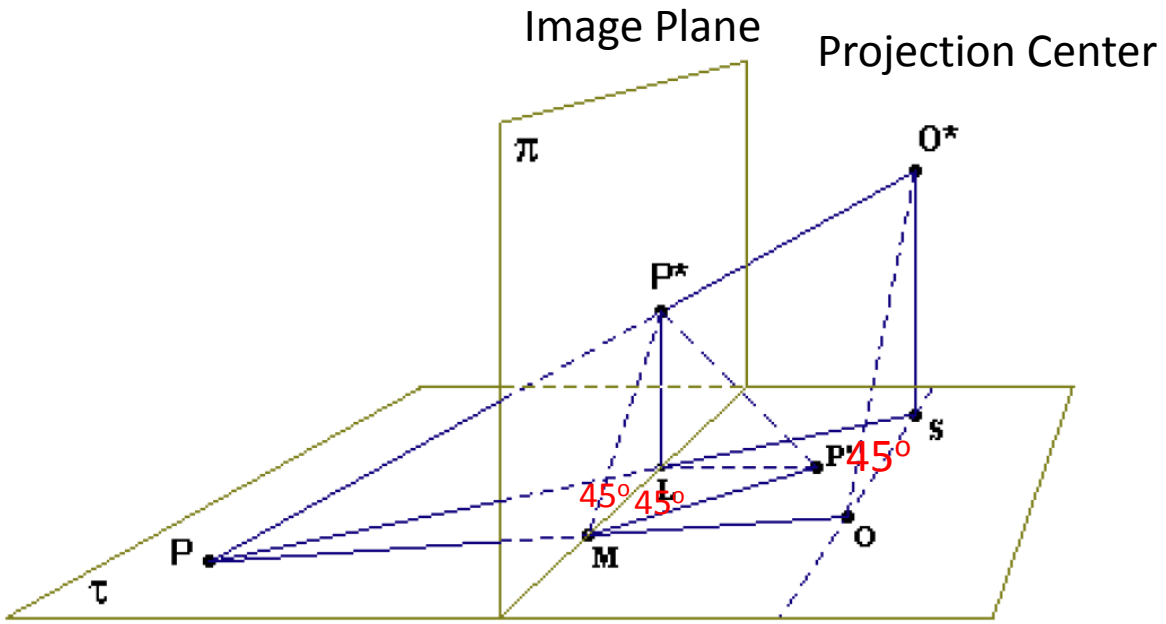
J. H. Lambert, Anlage zur Perspektive, edizione Peiffer - Laurent, 1981

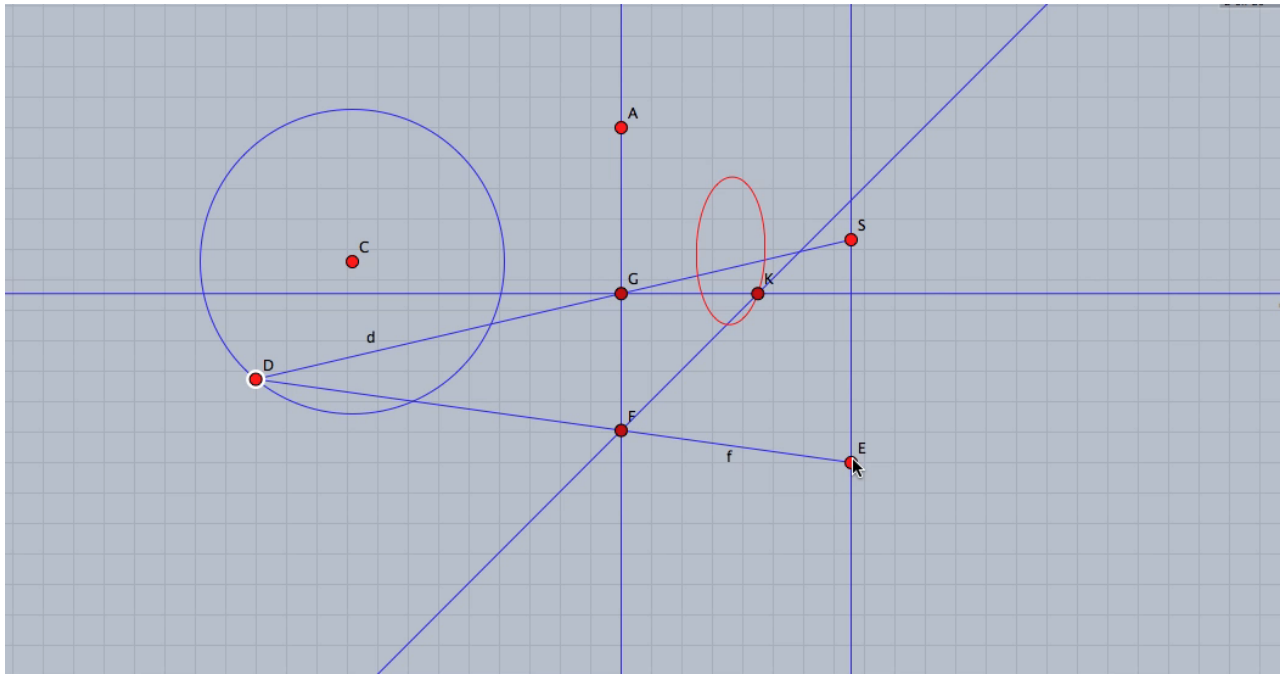
A circle is projected into an ellipse





Effect of height of camera on ellipse shape: the lower the camera, the more squeezed is the ellipse.





Effect of distance of projection center from image plane: Only the size not the shape of the ellipse changes!