Slide 19
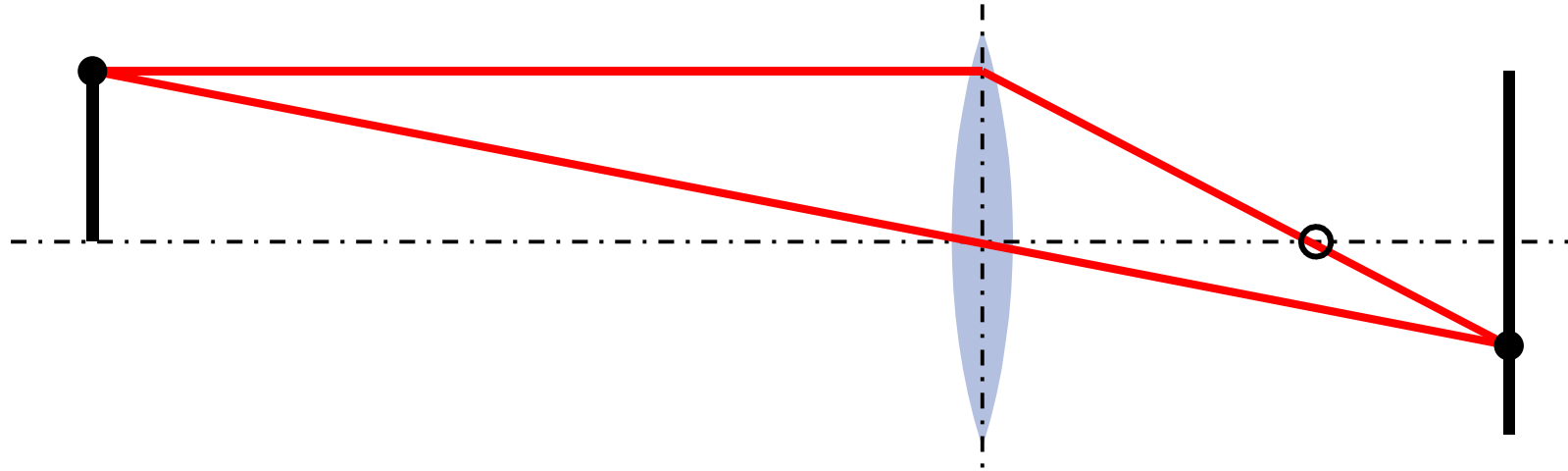
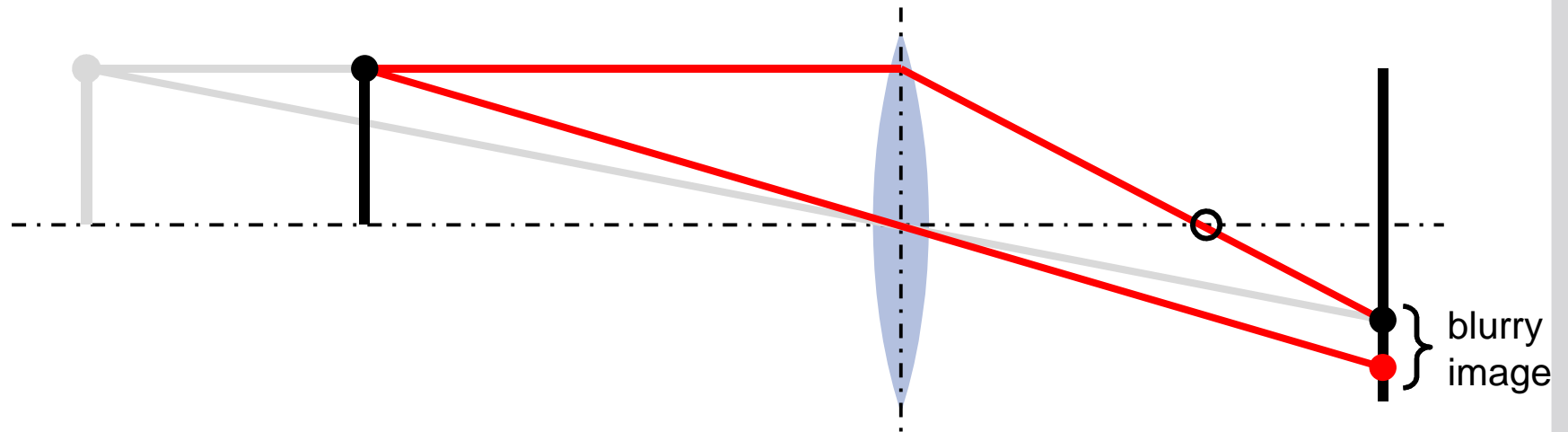# Thin Lenses cont.

- What happens when lens equation is violated?

Thin Lenses cont.

- What happens when lens equation is violated?
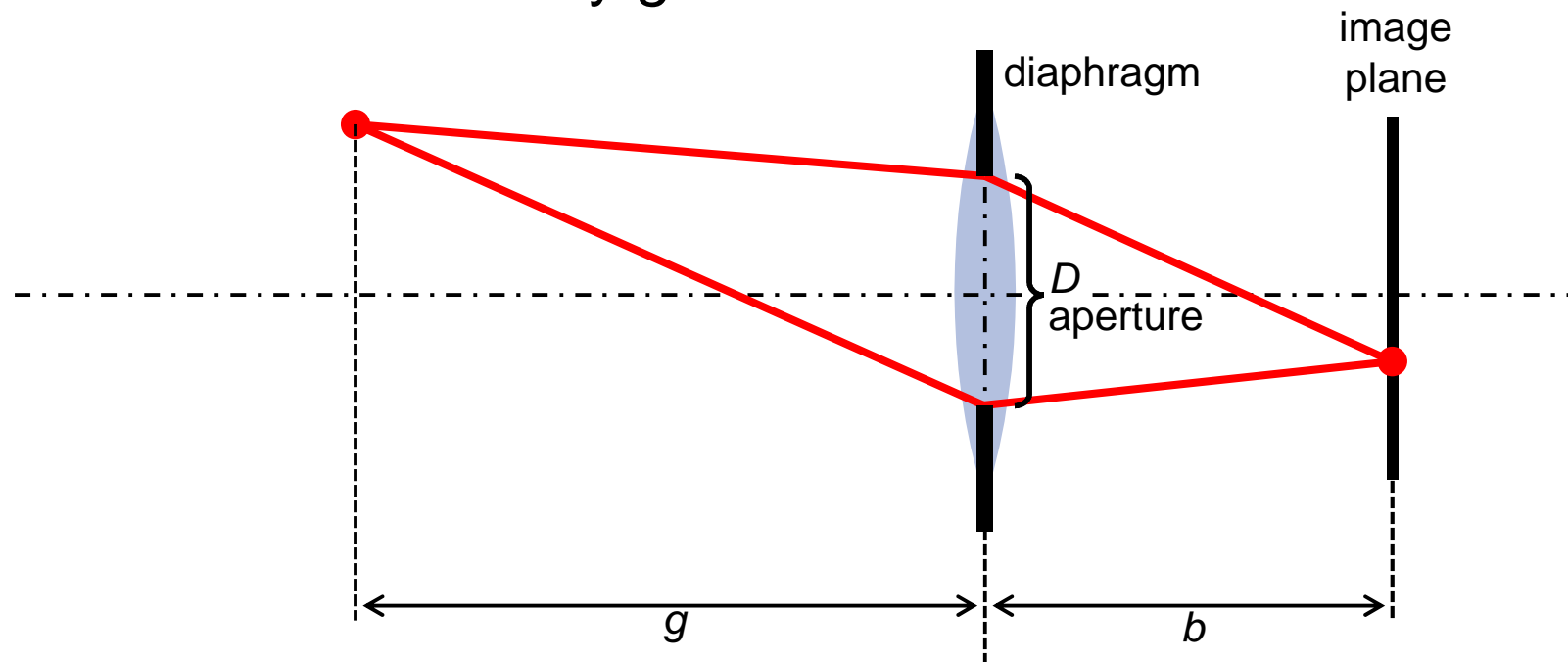

blurry image

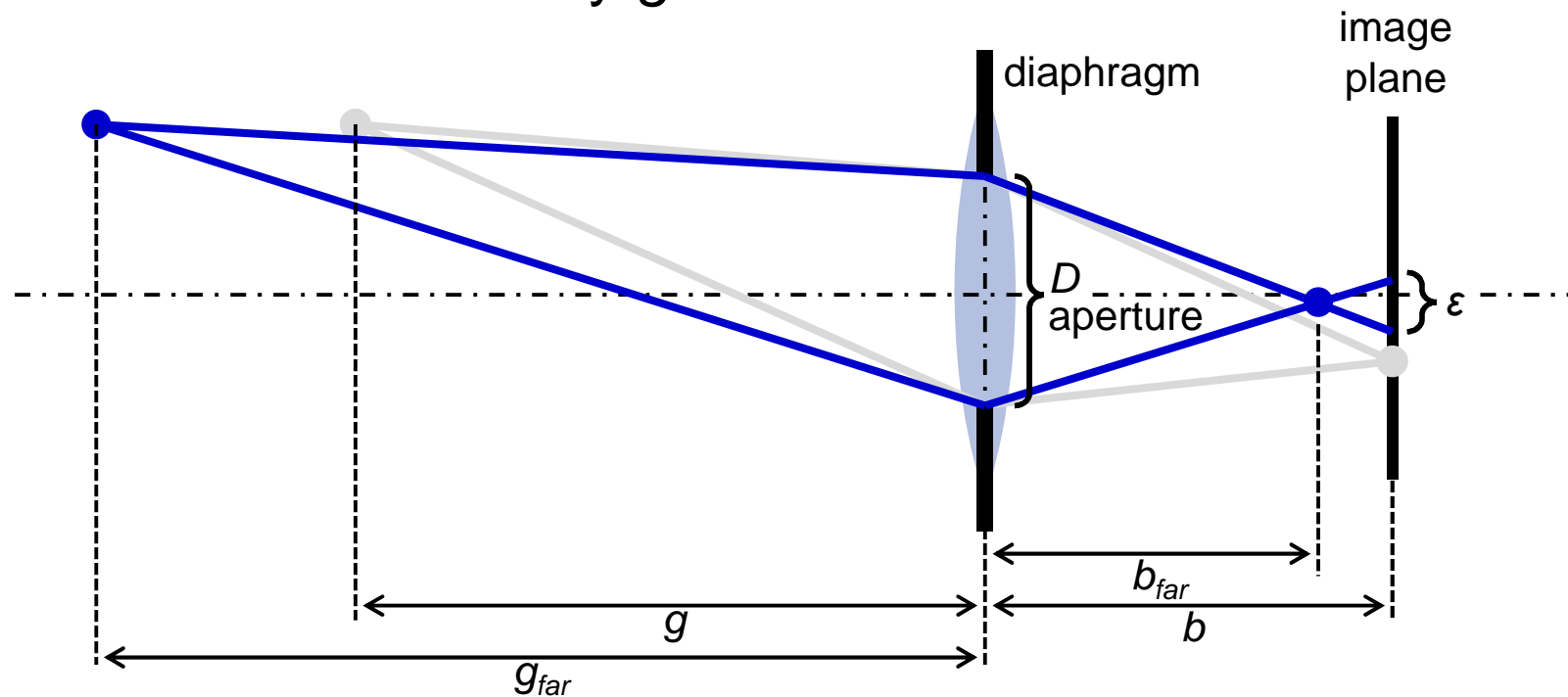- How much can we vary *g* with little effect?

Slide 20

Depth of Field

- How much can we vary *g* with little effect?

Depth of Field

- How much can we vary *g* with little effect?

- intercept theorem: $\dfrac{\epsilon}{D} = \dfrac{b - b_{far}}{b_{far}} = ... = \dfrac{f \cdot (g_{far} - g)}{g_{far} \cdot (g - f)}$
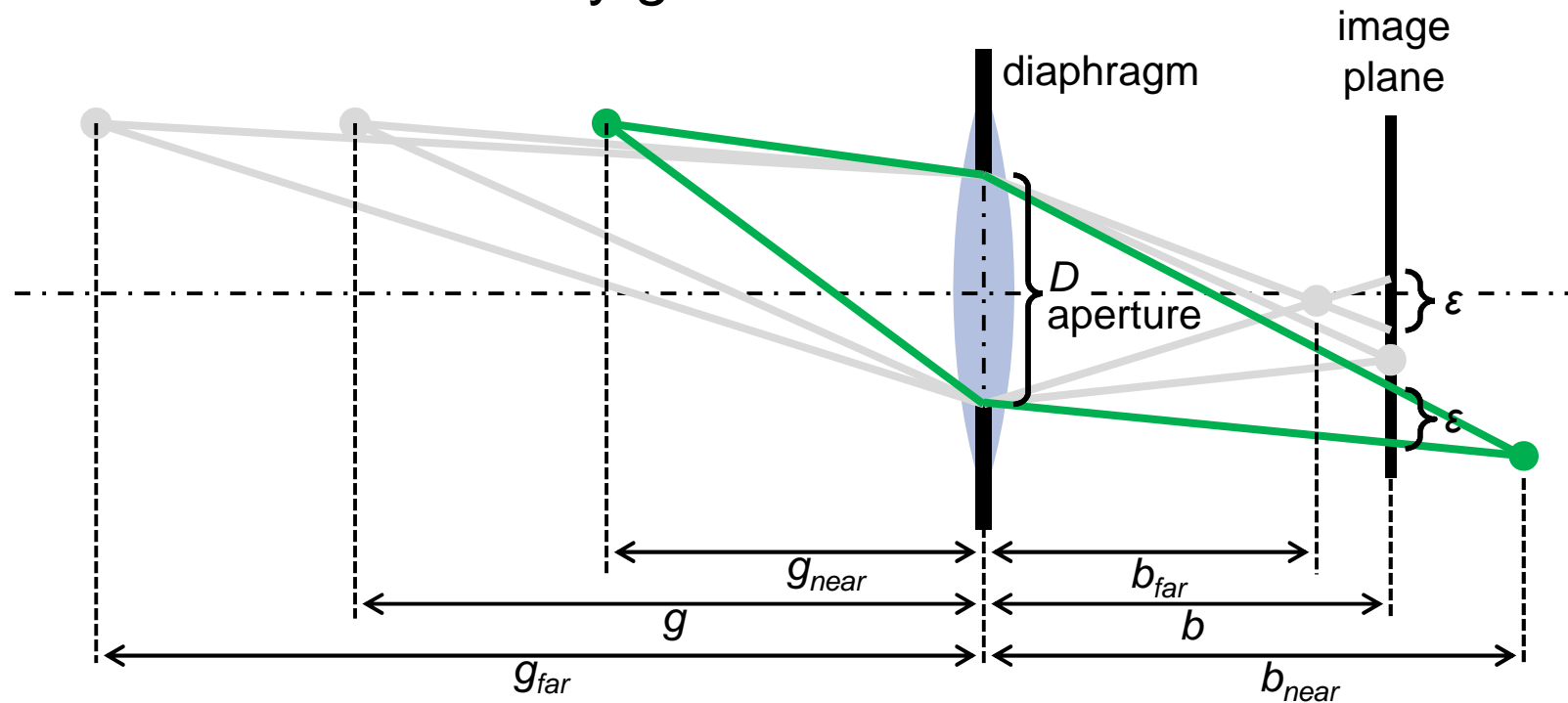
Depth of Field

- How much can we vary g with little effect?

- intercept theorem: $\dfrac{\epsilon}{D} = \dfrac{b - b_{far}}{b_{far}} = \ldots = \dfrac{f \cdot (g_{far} - g)}{g_{far} \cdot (g - f)}$

- intercept theorem: $\dfrac{\epsilon}{D} = \dfrac{b_{near} - b}{b_{near}} = \ldots = \dfrac{f \cdot (g - g_{near})}{g_{near} \cdot (g - f)}$

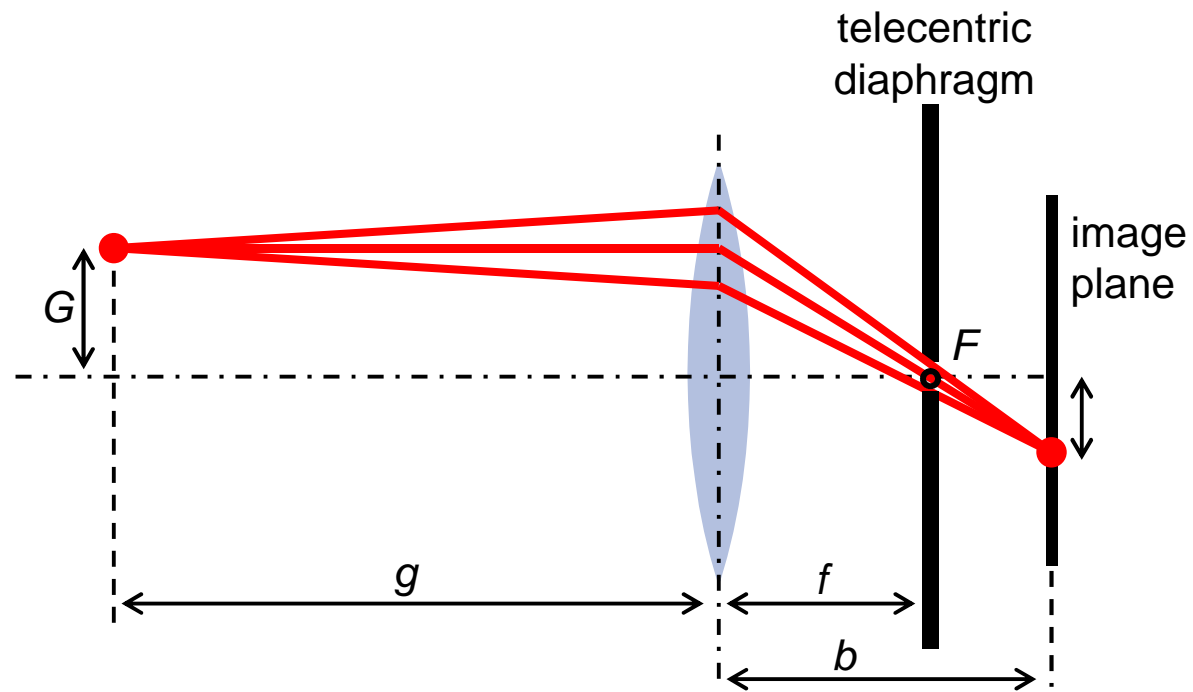Slide 46

Camera Calibration cont.

- effect of undistortion:

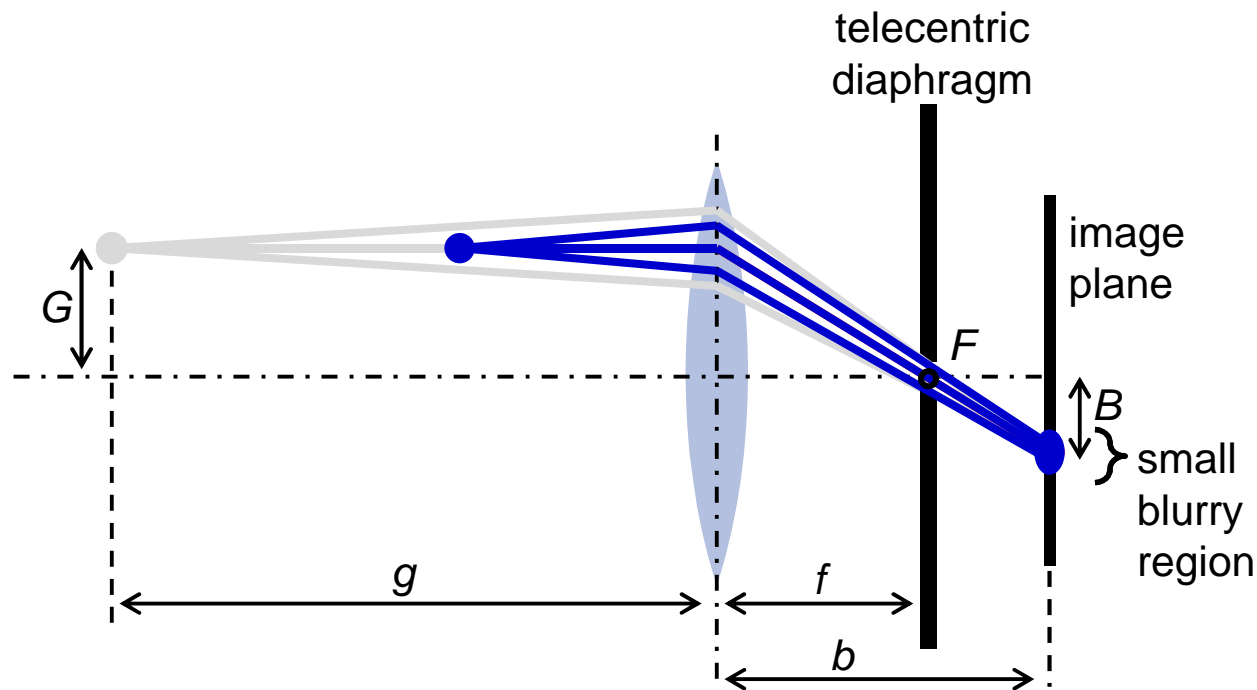# Camera Calibration cont.

- effect of undistortion:

Slide 53

Telecentric Lenses

telecentric diaphragm

image plane

G

F

g

f

b

magnification:

$$B = \frac{b - f}{f} \cdot G$$

Telecentric Lenses

telecentric diaphragm

image plane

G

F

B

small blurry region

g

f

b

magnification:

$$B = \frac{b - f}{f} \cdot G$$

depth of field:

$$\triangle g = 2 \frac{\epsilon}{D}(g - f)$$

pros: – magnification independent of object distance g

– improved depth of field

cons: – small aperture, lets poorly light through

– large, heavy, and expensive

application area: – microscopy