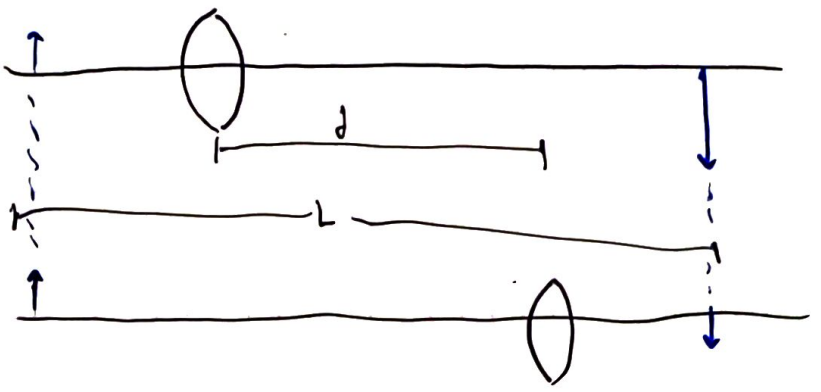
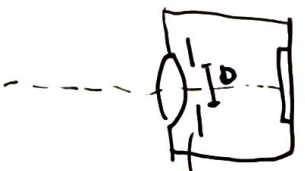
let $L > 4f$ ##Week 2 pt. 2##



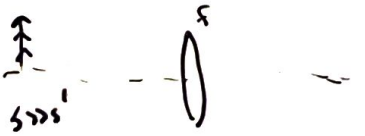
then $f = \frac{L^2 - d^2}{4L}$ prove it.

Back to the camera:



can control exposure by shuttering or by changing aperture

Image brightness $\propto D^2$



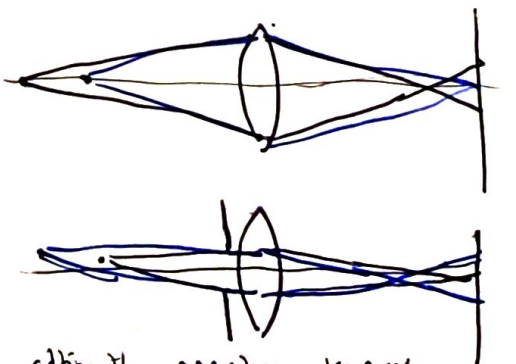
$\Rightarrow s' \approx f$ $m = \frac{s'}{s}$ so the brightness $\propto \frac{1}{f^2}$

define relative aperture $A = \frac{f}{D}$, sometimes called f stop or f/#

brightness $\propto \frac{1}{(f/\#)^2}$

changing the aperture changes depth of field

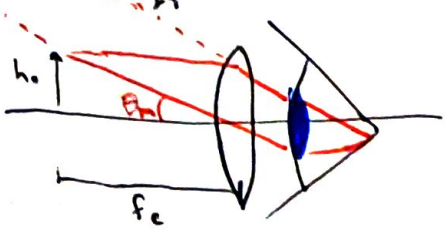
f/#	f/D	1/brightness
1	1	1
1.4	1.4	2
2	2	4
2.8	2.8	8
5.6	5.6	
⋮	⋮	



adding the aperture decreases blurring, for a bigger length

Simple magnifier

$\tan(\theta_o) \approx \frac{h_o}{25}$



$\tan(\theta_m) \approx \frac{h_o}{f_e}$

define the magnificati

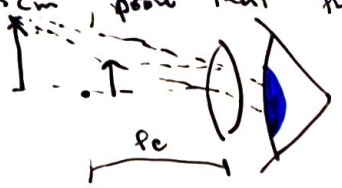
$m = \frac{\tan\theta_m}{\tan\theta_o} \approx \frac{\theta_m}{\theta_o}$ (angular magnification)

$m_\theta = \frac{h_o}{f_e} \cdot \frac{25}{h_o} = \boxed{\frac{25}{f_e}}$

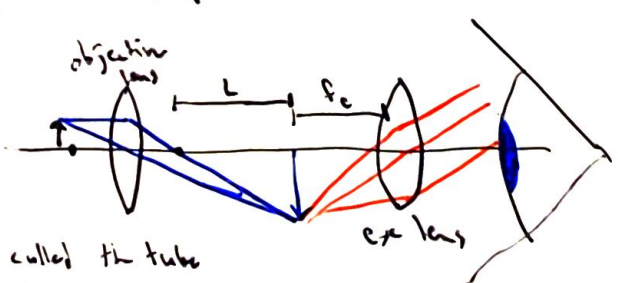
First microscope was like this, Leeuwenhoek
↳ look up foldscope

fun thing:

if the image is a 25 cm, prove that the angular mag is $\frac{25}{f_e} + 1$



compound microscope



L is called the tube length

$L = 160$ mm traditionally