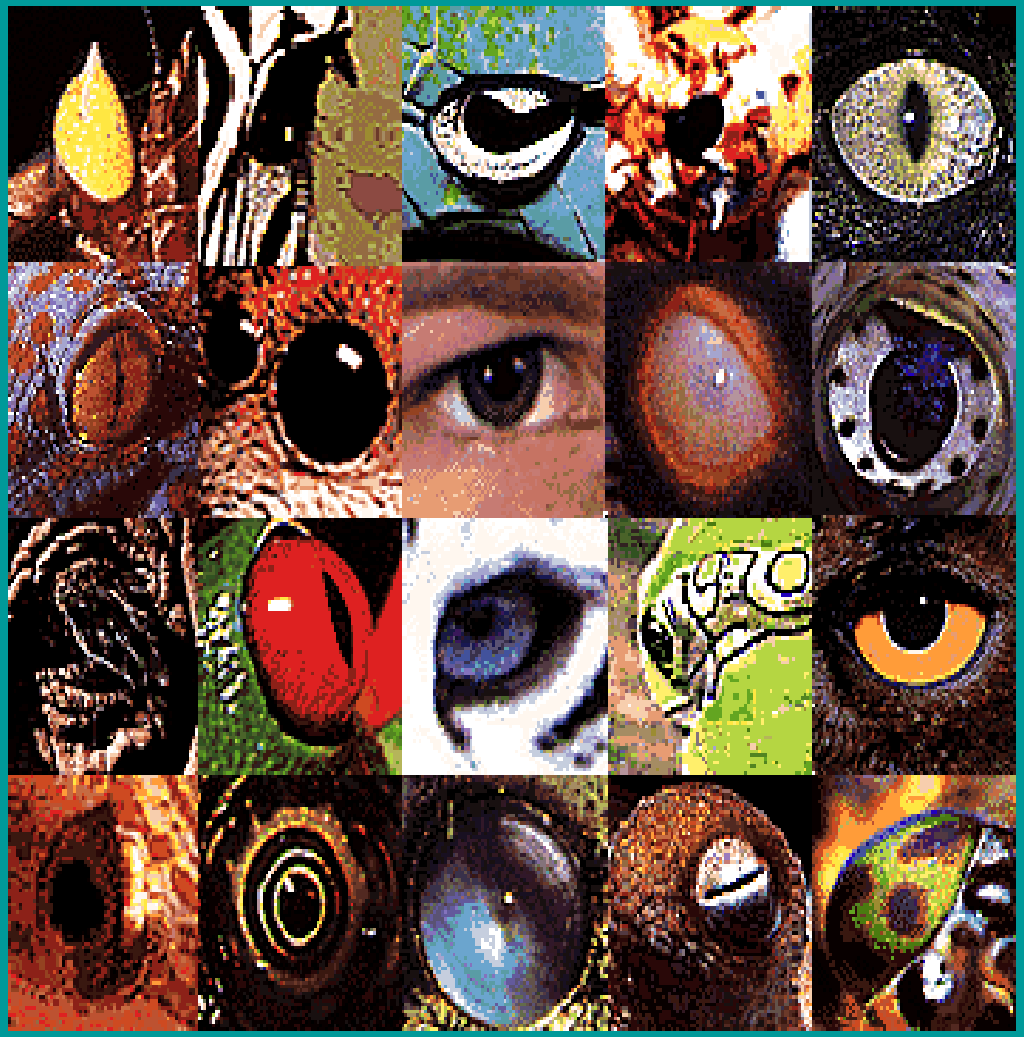
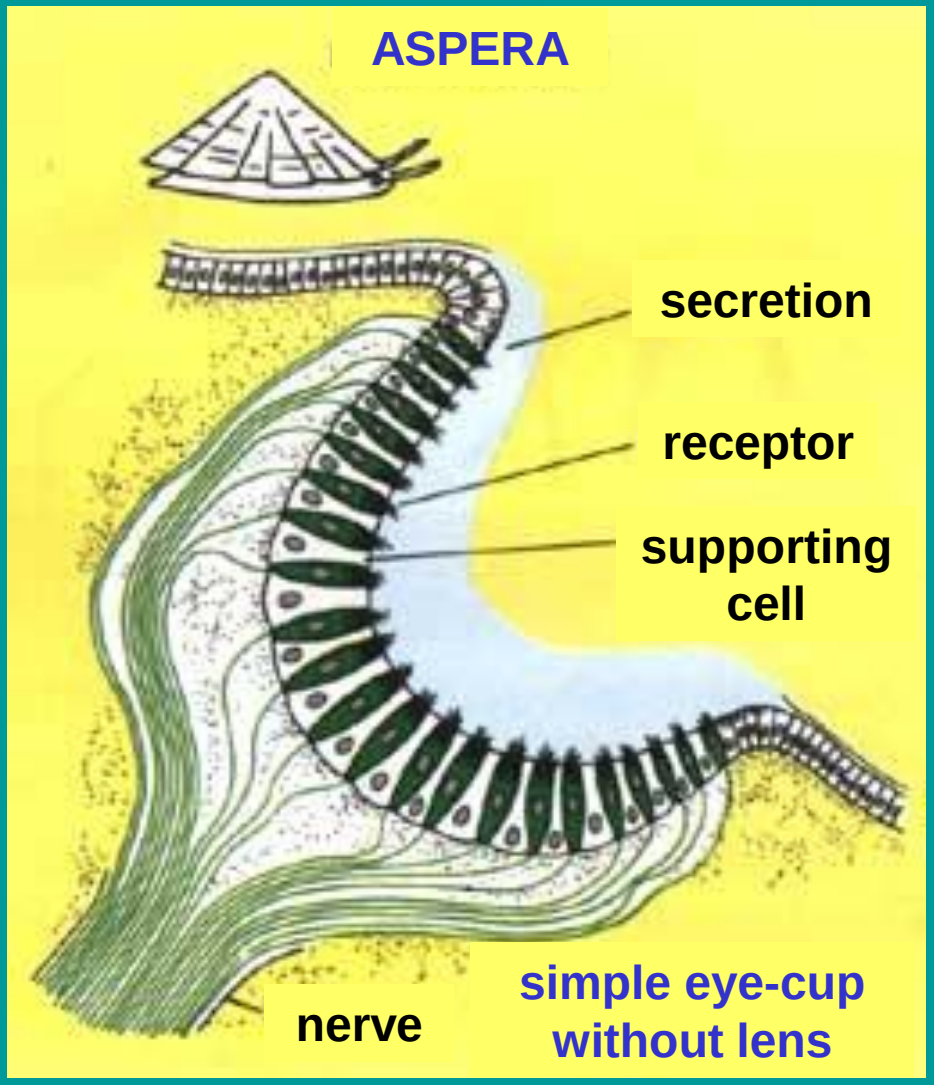
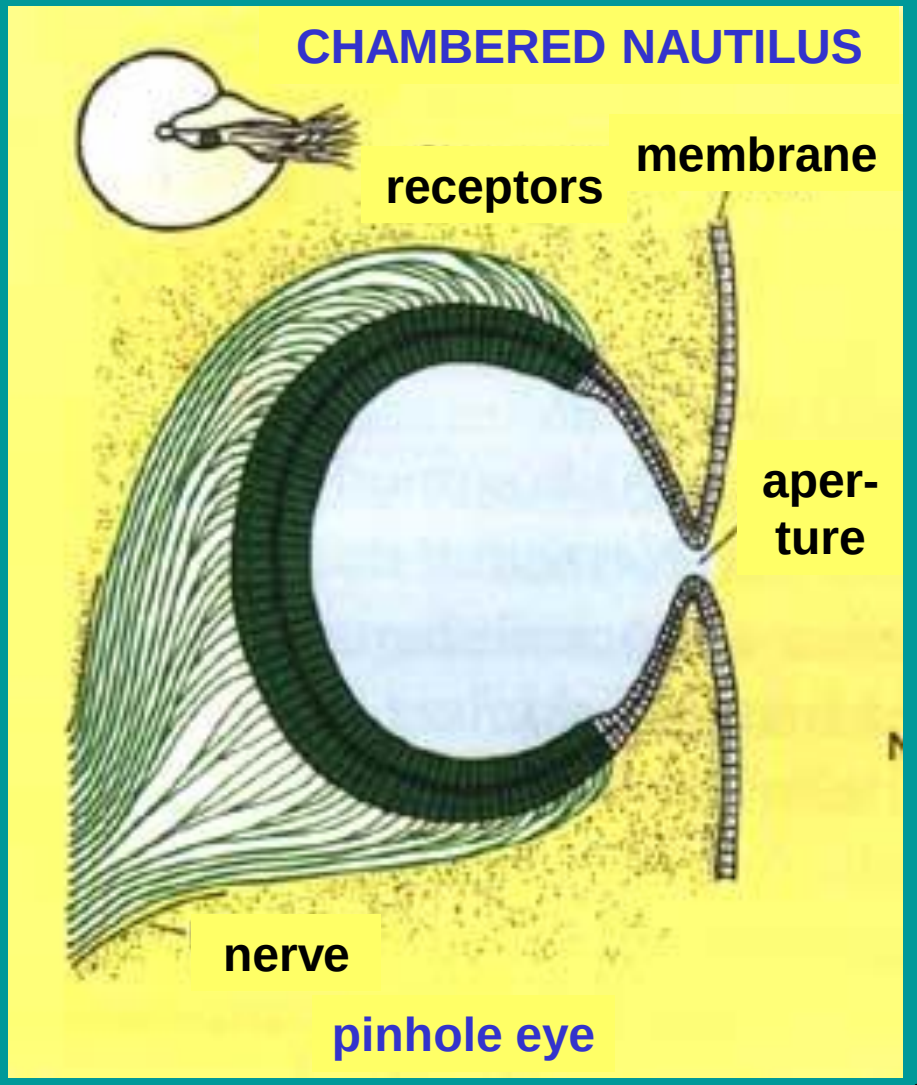
OPTICS OF THE EYE 1.

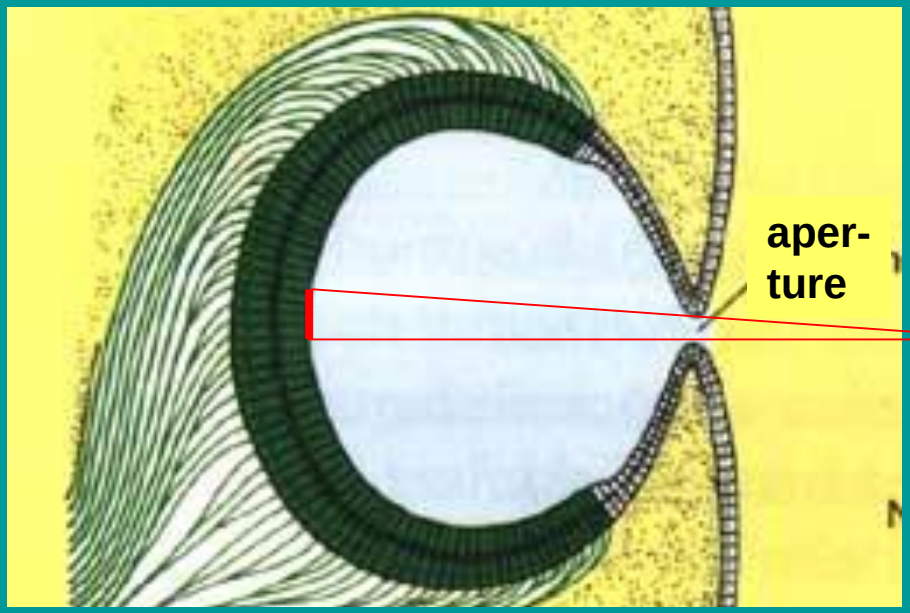
Development of the visual organ



Development of the visual organ

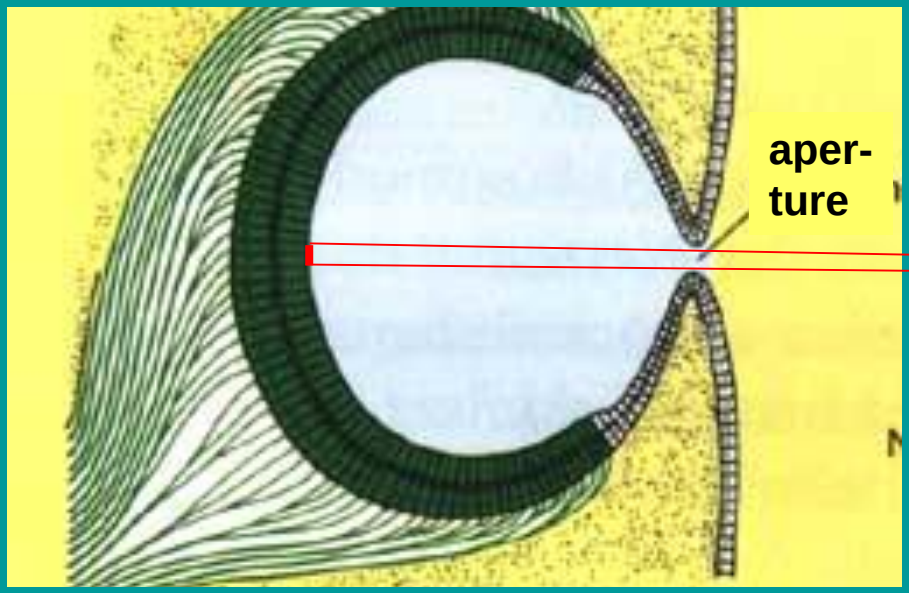






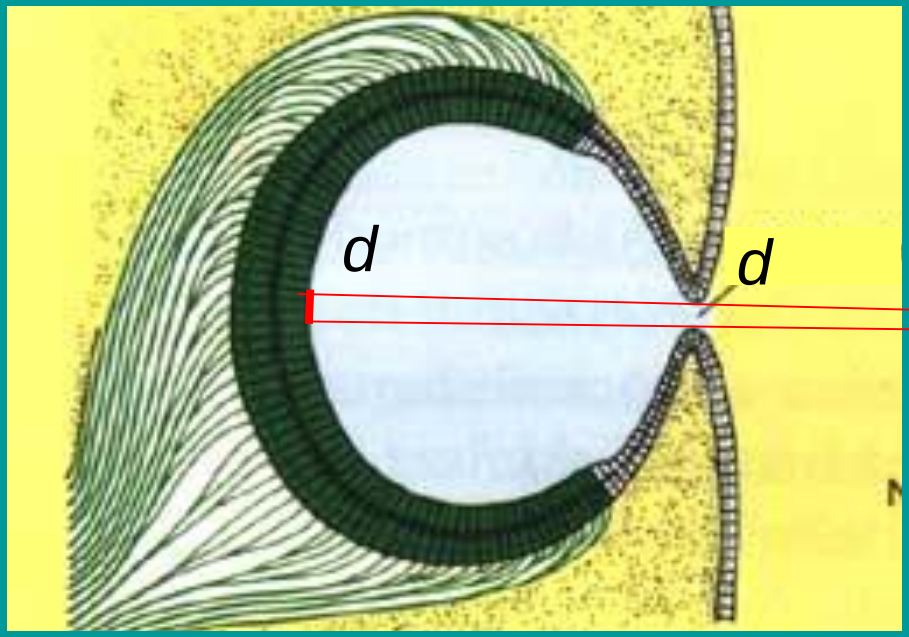
Disadvantages:

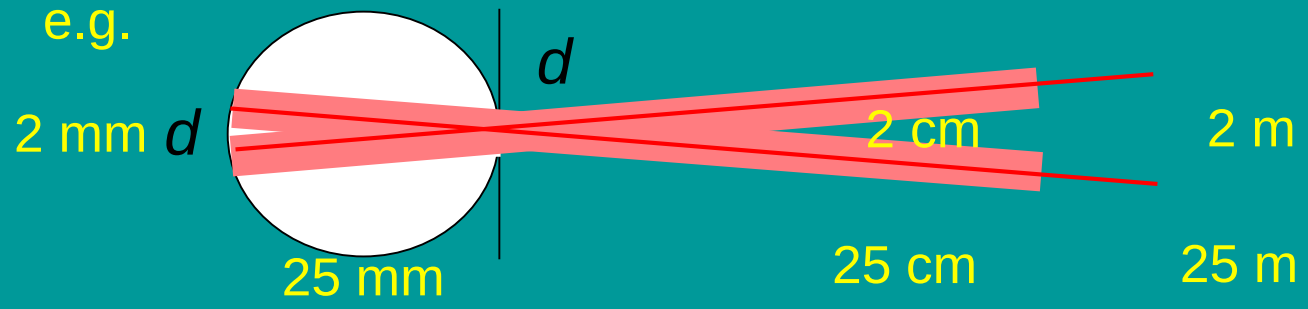
- ☹ open
- ☹ not point like imaging
- ☹ poor resolution



Size of the spot ≈ size of the aperture (d)

Resolution:

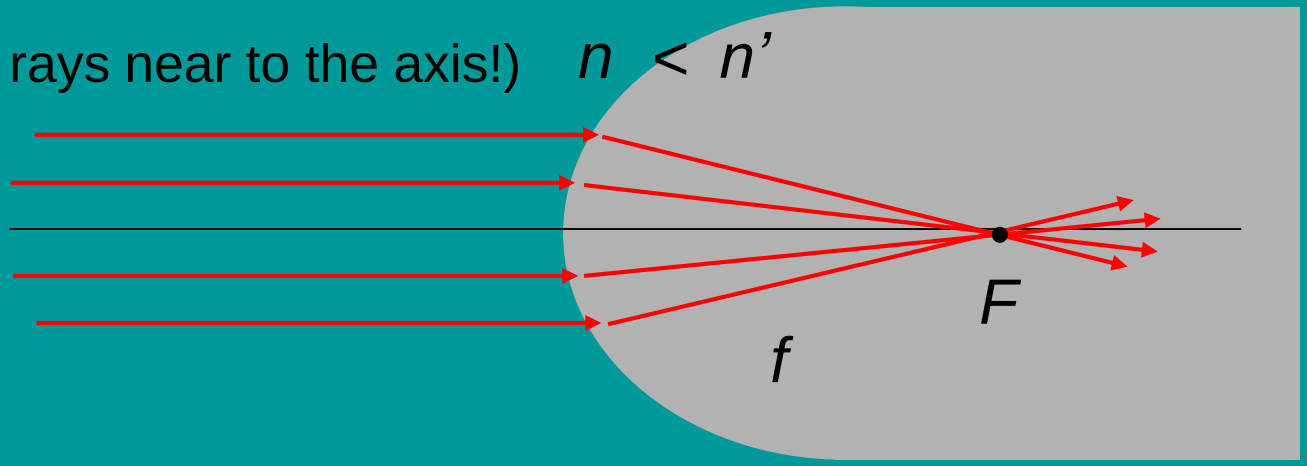




smaller *d* for better resolution → loss of intensity and diffraction

Refraction on curved surface

(for light rays near to the axis!) $n < n'$



$$f = R\frac{n'}{n'-n}$$

Power of the surface (D): $D = \frac{n'}{f} = \frac{n'-n}{R}$

n: refractive index of the 1. medium

n': refractive index of the 2. medium

R: radius of the curved surface

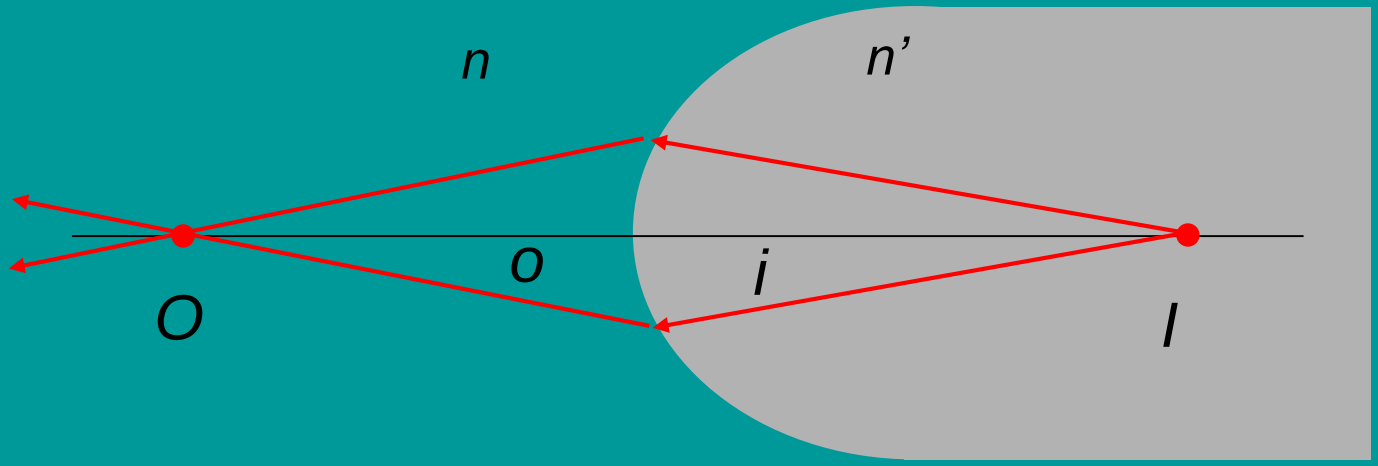
>0, when convex

<0, when concave

D>0 ⇒ convergent

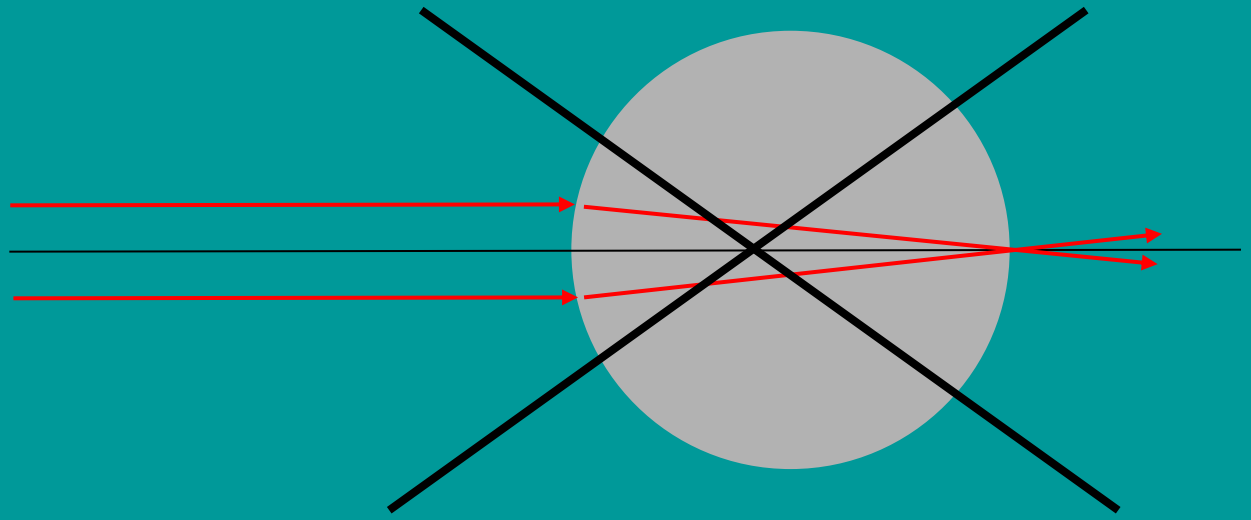
D<0 ⇒ divergent

Image formation on curved surface



$$D = \frac{n'}{i} + \frac{n}{o}$$

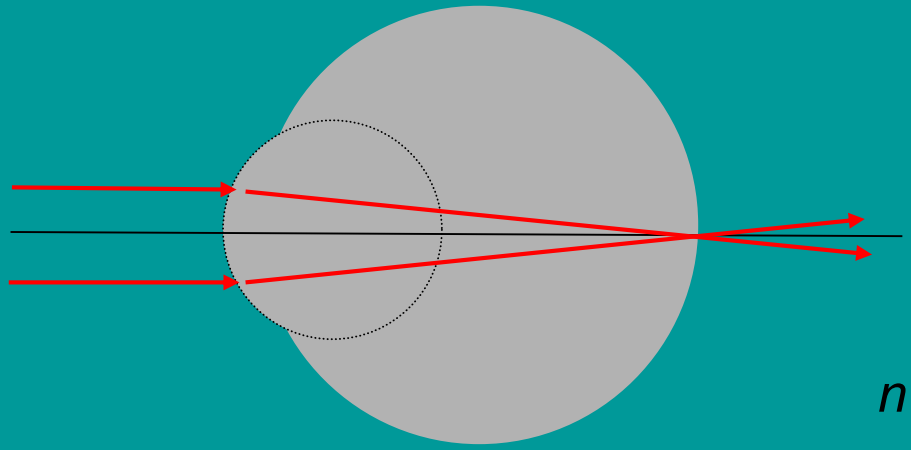
Simple sphere as eye?



$$f \leq 2R$$

$$f = R\frac{n'}{n'-n} \leq 2R$$

$$n = 1 \quad \Rightarrow \quad n' \geq 2\,!!$$

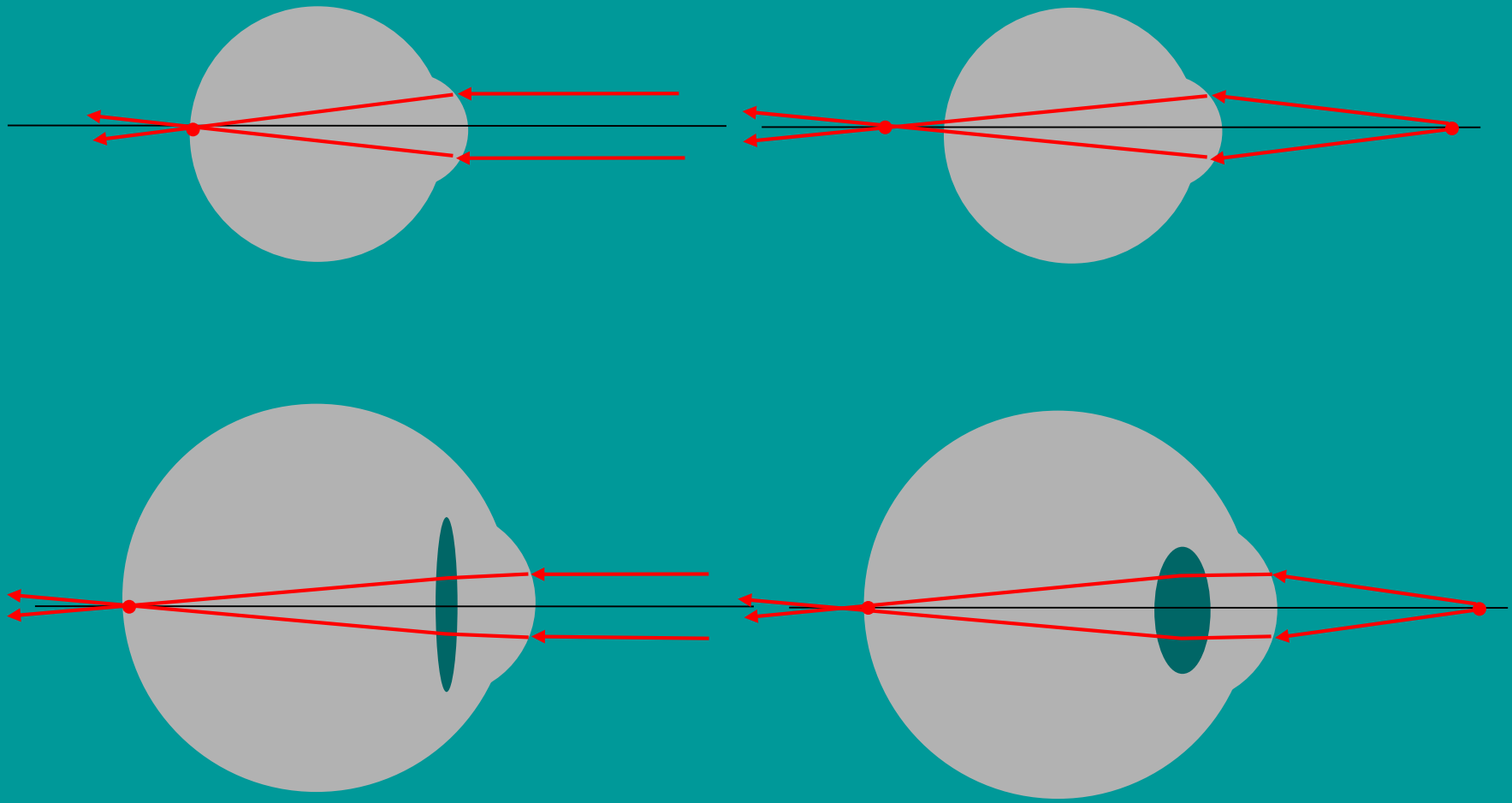


n' = 1.333

$f = 2R$ = 25 mm

$\Rightarrow$ $r \approx$ 6.25 mm

Accommodation?



Development of the visual organ