







Myopie nocturne

André St-Pierre

Présentation au CAAS

6 mars 2026

La nuit…..

- Difficulté de conduite
- Lumières aveuglantes , DEL
- Pilotes d’avion dans le brouillard et la neige
- Hâlos autours des lumières
- Étoiles floues

Myopie nocturne

Nevil Maskelyne
1732-1811

5e astronome royal de Greenwich
Méridien de Greenwich
Masse de la Terre
Détermination de la longitude
Transit de Vénus 1761
Psychologie statistique

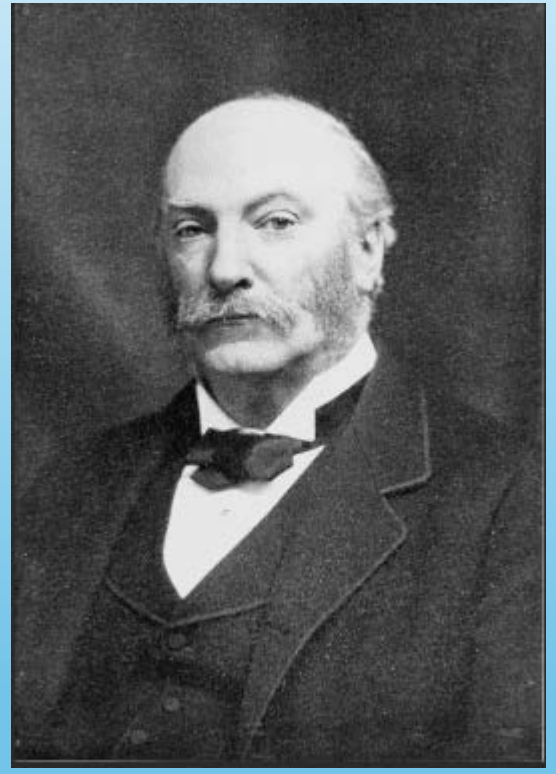
Décrit la myopie nocturne

Royal Museums Greenwich



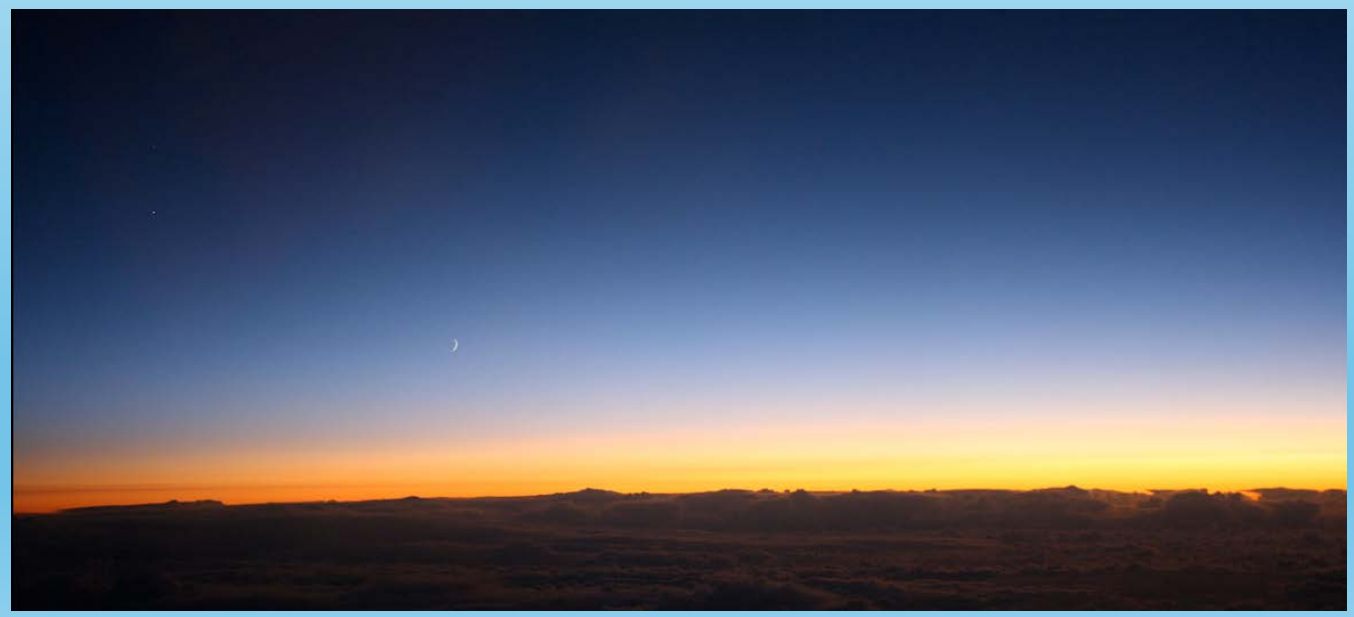
Portrait of Nevil Maskelyne, oil on canvas, by Gerard van der Puyl, 1785, Royal Society of London (artuk.org)

William Strutt, Lord Rayleigh, 1883

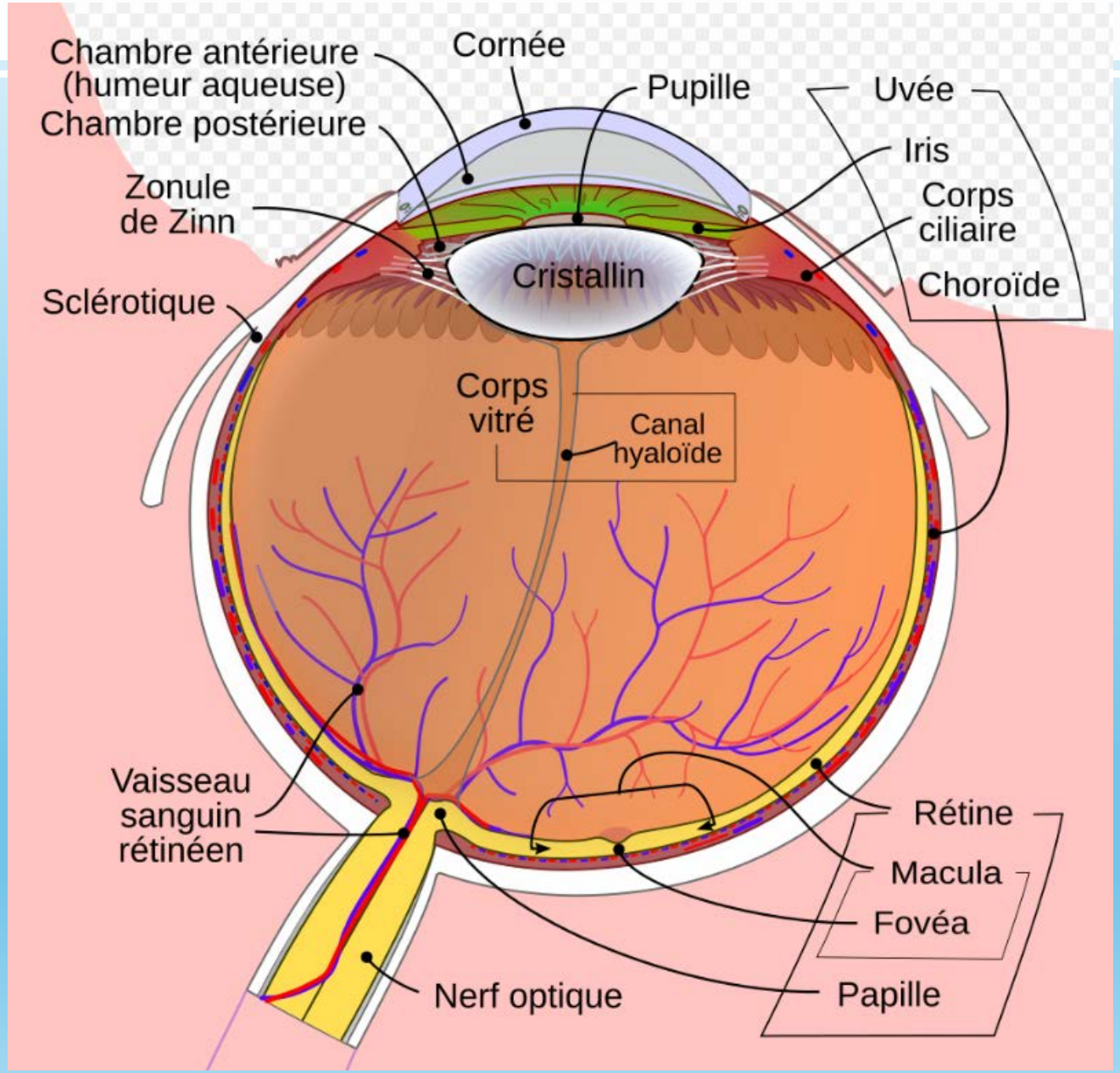


1842-1919

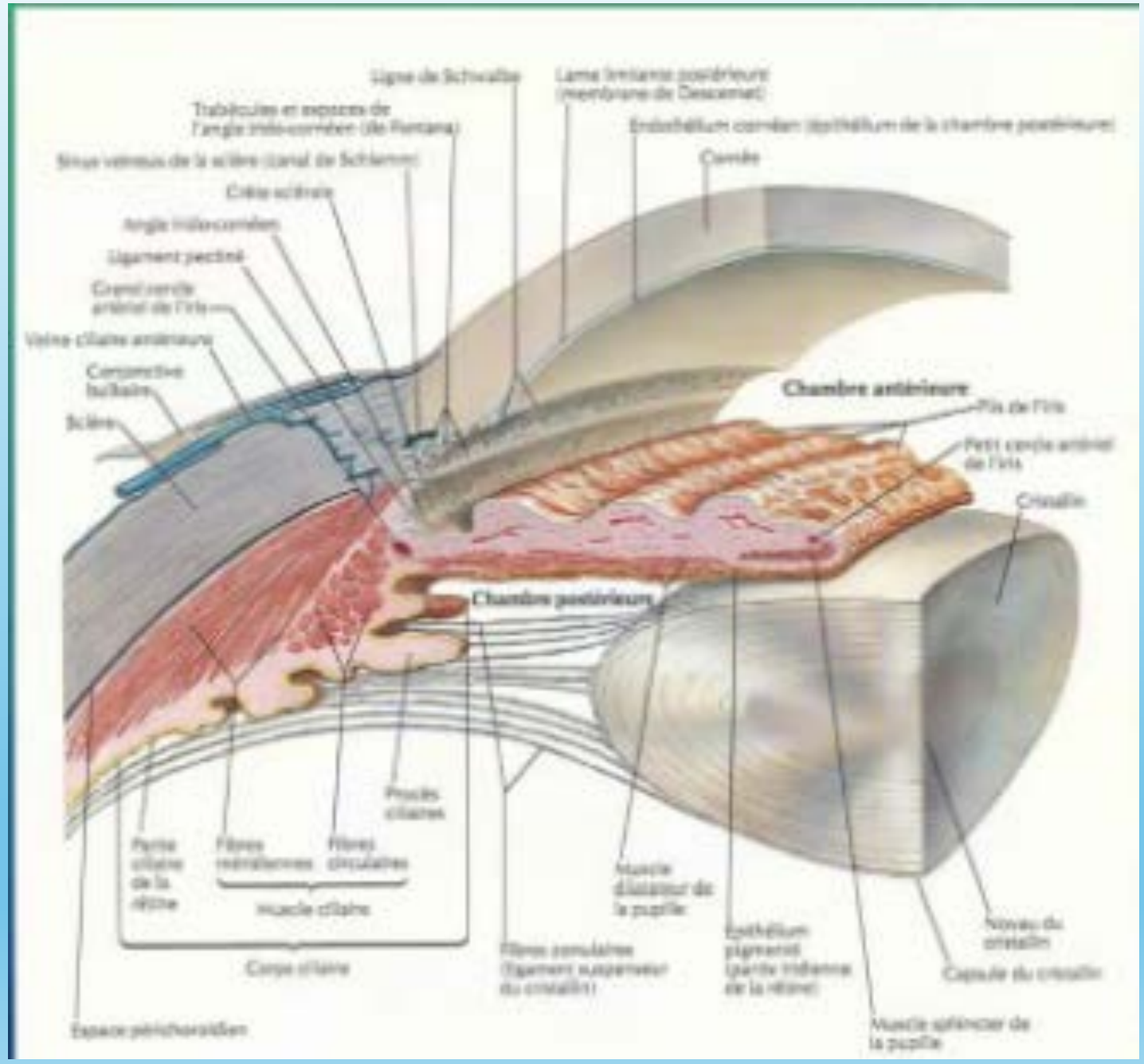
- “I have found that in a 36 inches negative focus my vision is rendered much sharper and is attended with increased binocular effect”.

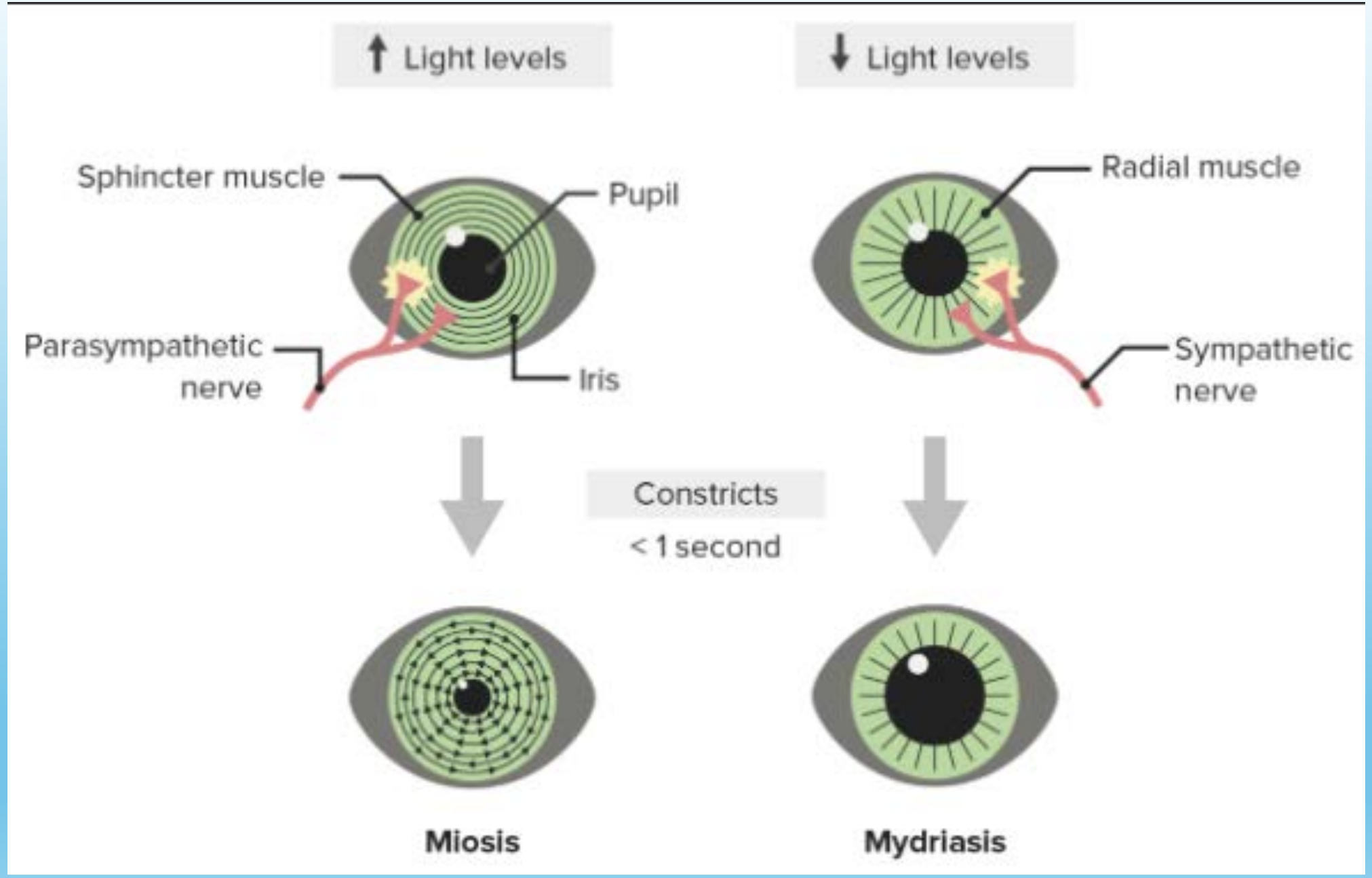


Anatomie de l'oeil



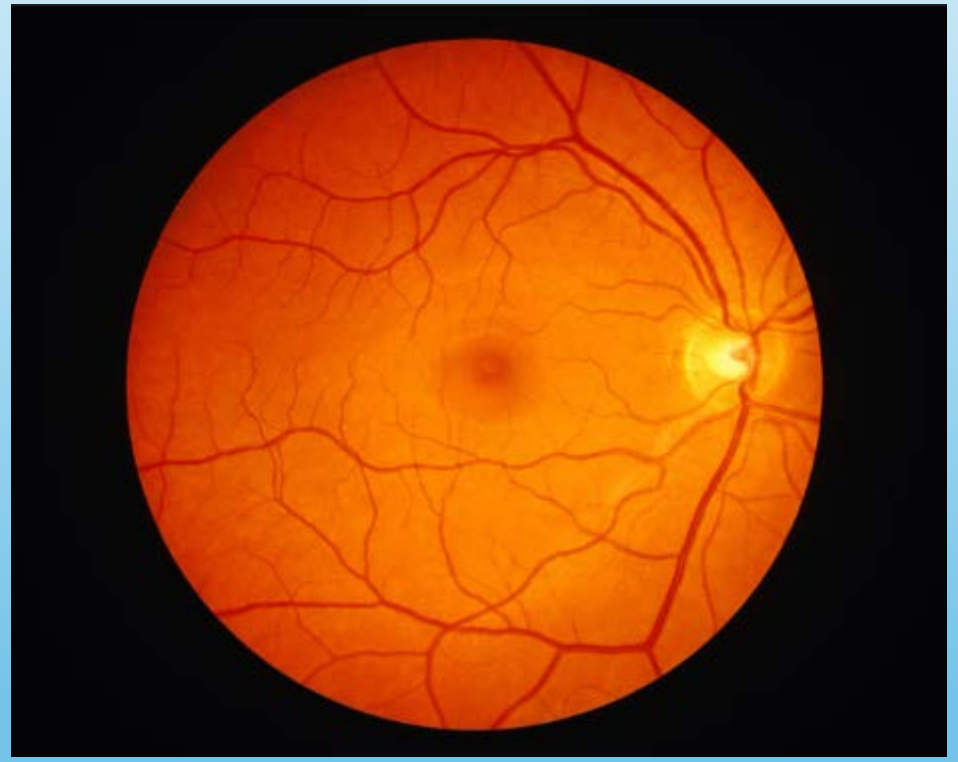
Cornée et cristallin

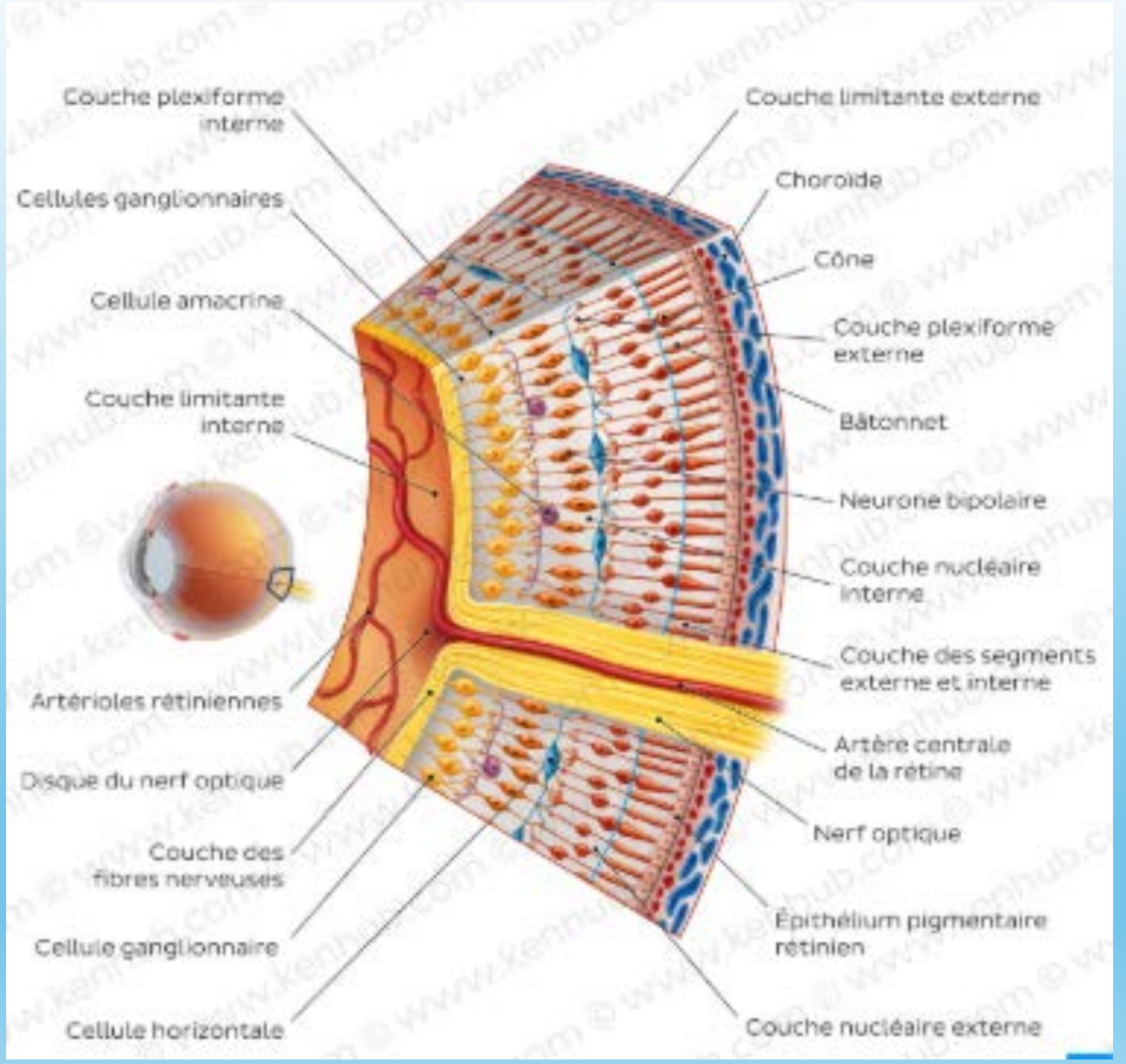




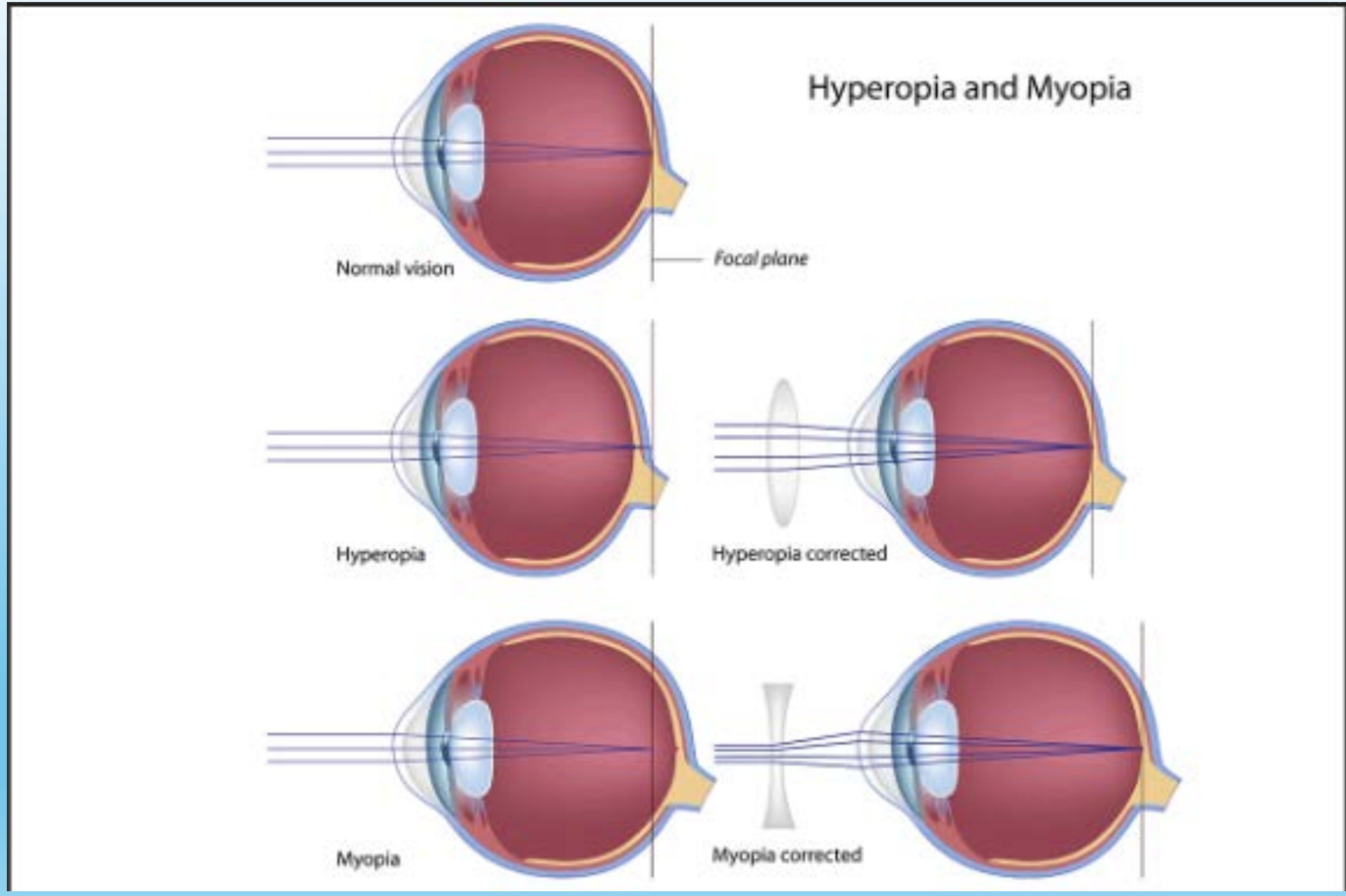
Lecturia.com

Rétine





About.com Health, Kenhub.com


Hyperopia and Myopia
Normal vision
Focal plane
Hyperopia
Hyperopia corrected
Myopia
Myopia corrected

A BRIEF HISTORY OF "NOCTURNAL MYOPIA" AND RELATED PHENOMENA*

Henry A. Knoll†
School of Optometry, The Ohio State University
Columbus, Ohio

Écarts de dioptries mesurées (Schober)

-1 à -4 D Moyenne -2 D

Amplitude d'accommodation nulle en obscurité

Presbytie nocturne à foyer fixe

American Journal of Optometry and Archives of
American Academy of Optometry, feb 1952

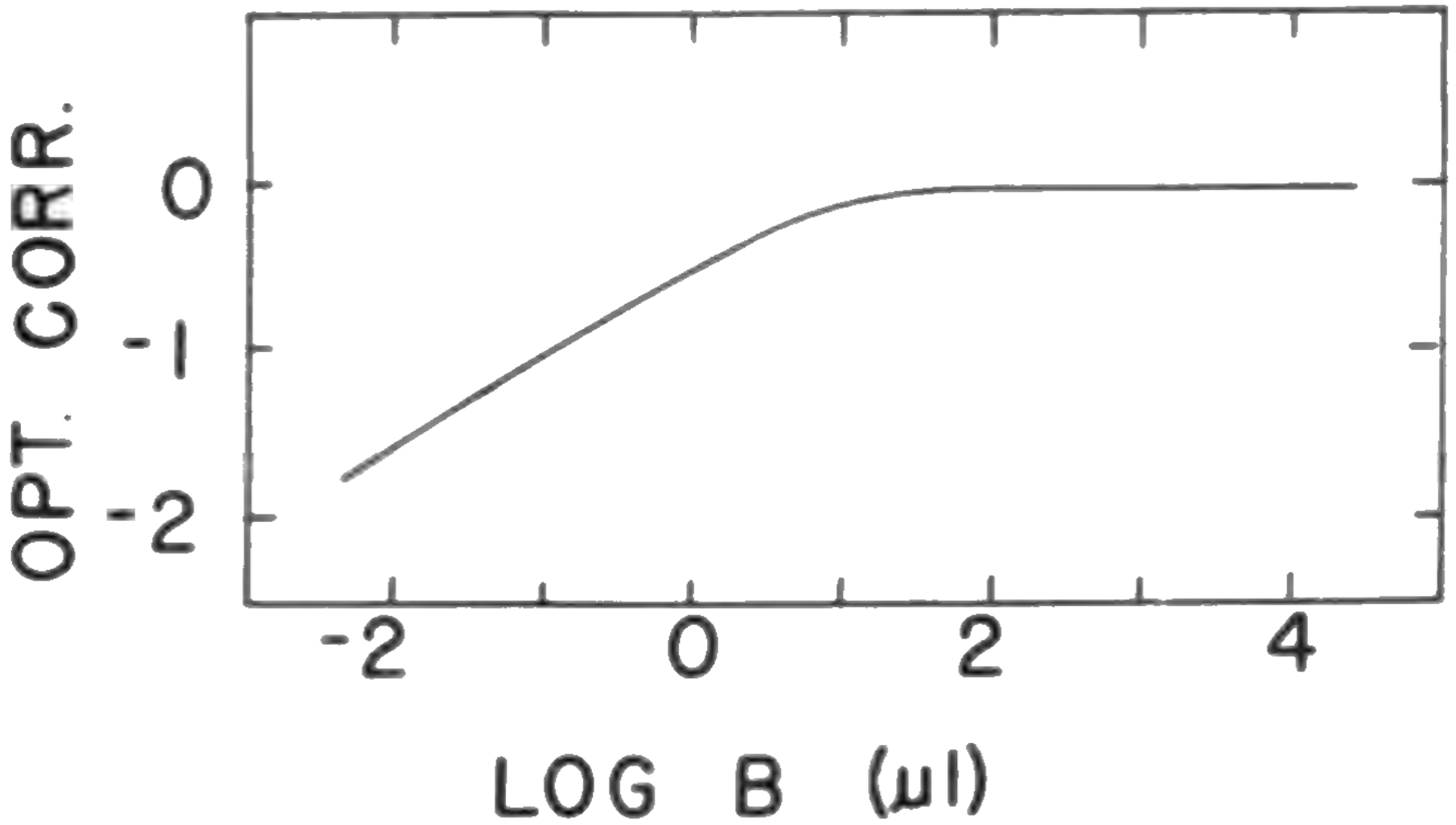


Fig. 1. Optimum Spectacle Correction as a Function of Field Luminance (micro lamberts). The correction is relative to the high luminance correction. (These data are reproduced here with permission of Dr. R. Tousey. Naval Research Laboratory Washington, D. C.)

Histoire

- 1880-1910
  - Aberration sphérique
- 1940…
  - Dilatation chimique en mydriase
  - Aberration chromatique

    Sensibilité aux couleurs (550 nm -> 510 nm) (Otero, 1943)
- !945
  - Influence de la durée d'exposition (Cabello)
- 1946-7
  - Correction par lentille (Ivanoff)
- 1947-8
  - Effet de la mydriases sur le cristallin (Ronchi)
  - Effet du système nerveux sur la relaxation nocturne de l'accommodation

Lois de réfraction

Snell (1580 – 1626)

Descartes (1595 – 1650)

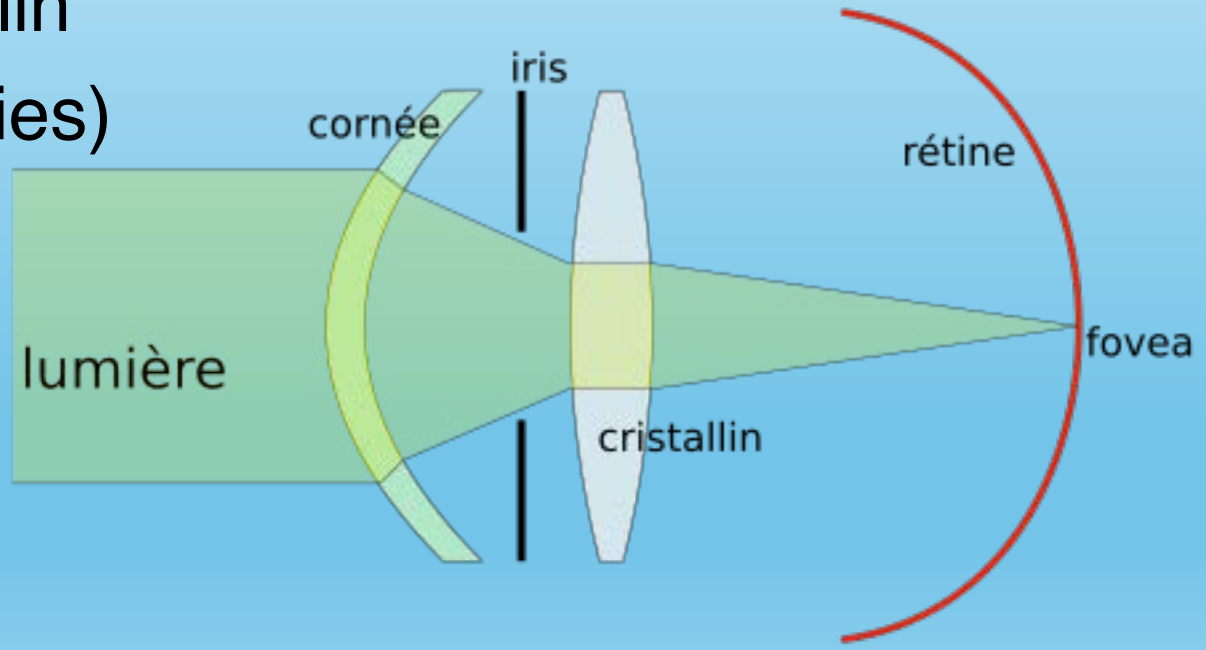
Passage de la lumière en angle entre 2 milieux dense





Trajet de la lumière dans l'oeil

- Cornée (lentille de 43 dioptries)
- 2 rayons de courbures (7.8 et 6.8 mm)
- Humeur aqueuse avant le cristallin
- Cristallin (lentille de 15-20 dioptries)
- Humeur vitrée
- Rétine

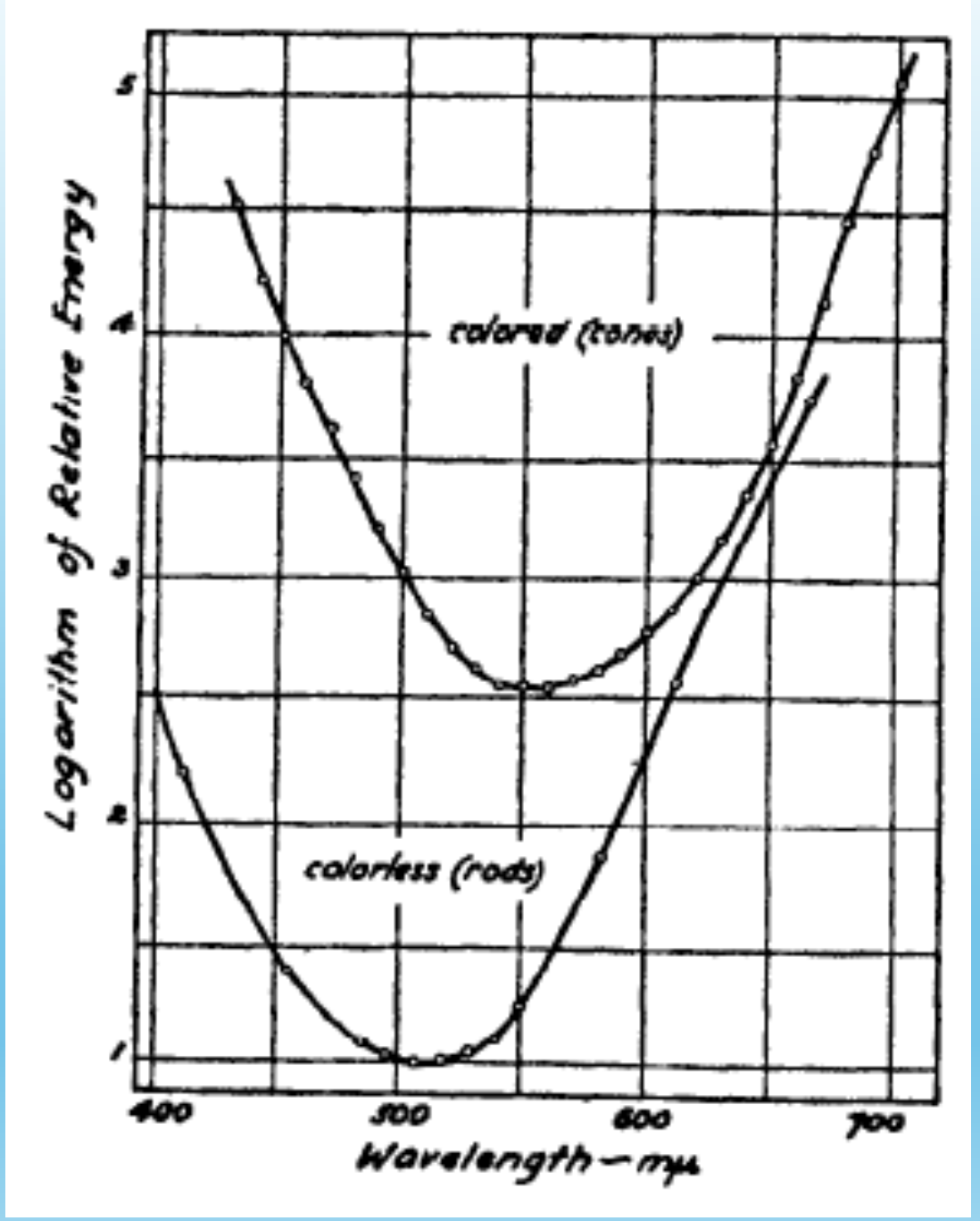


Sensibilité

Photopique
Cônes (haut) 555 nm
1-10 000 lux

Scotopique
Bâtonnets (bas) 507 nm
0.001 – 1 lux

- Hecht, 1937



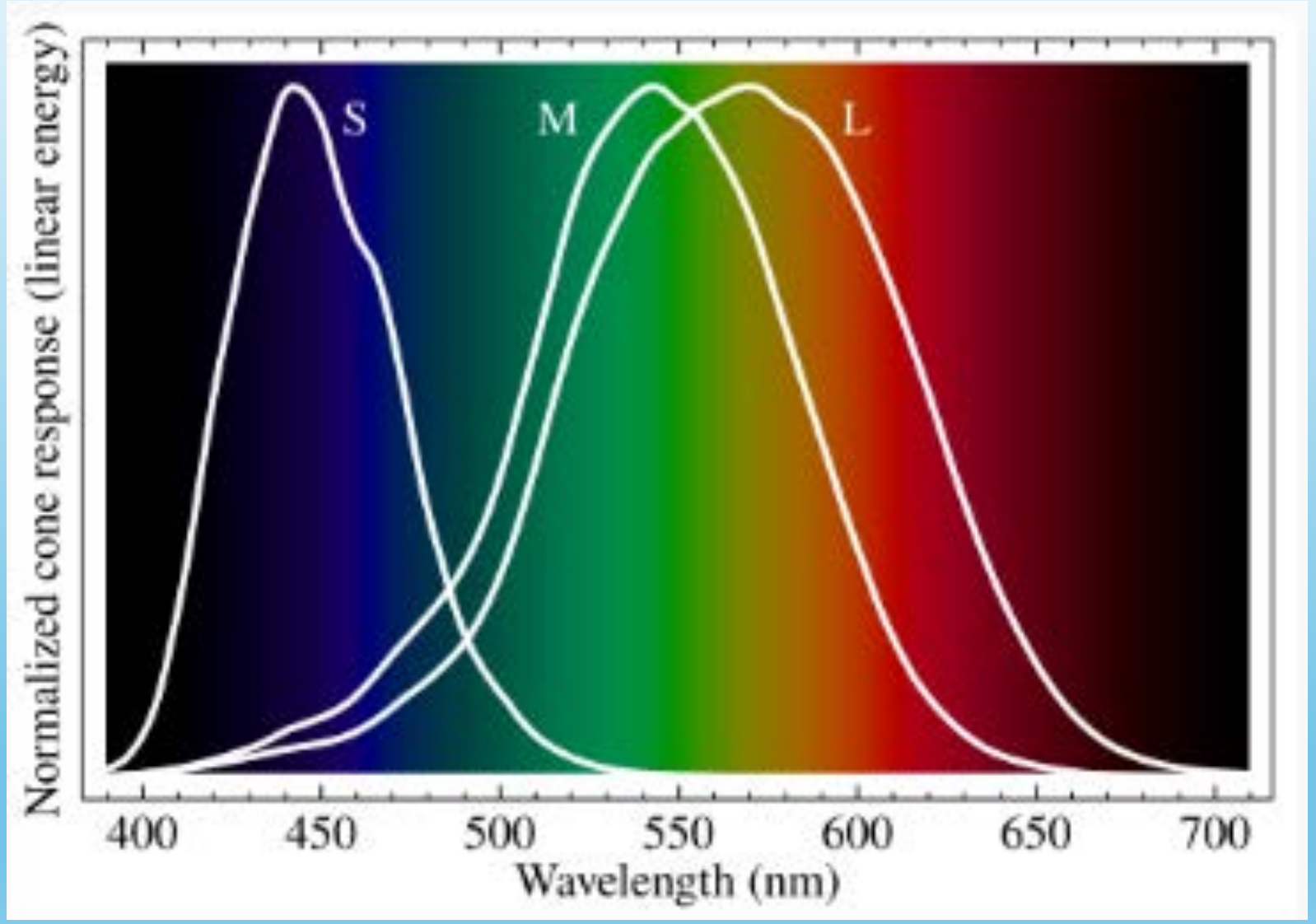
Cônes

- S : 420-440 nm
- M : 534-545 nm
- L : 564-580 nm

- 6-7 millions

- (92 M bâtonnets,
  498 nm)

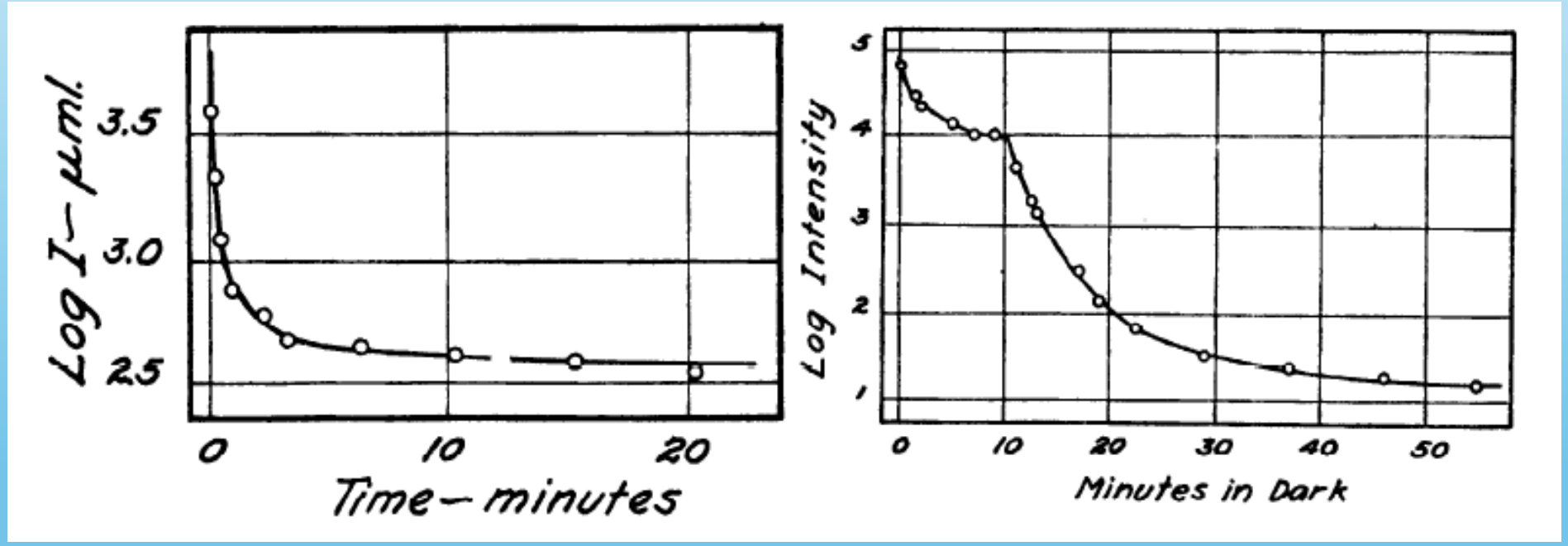
- Wikipedia



Vitesse de l'adaptation à l'obscurité

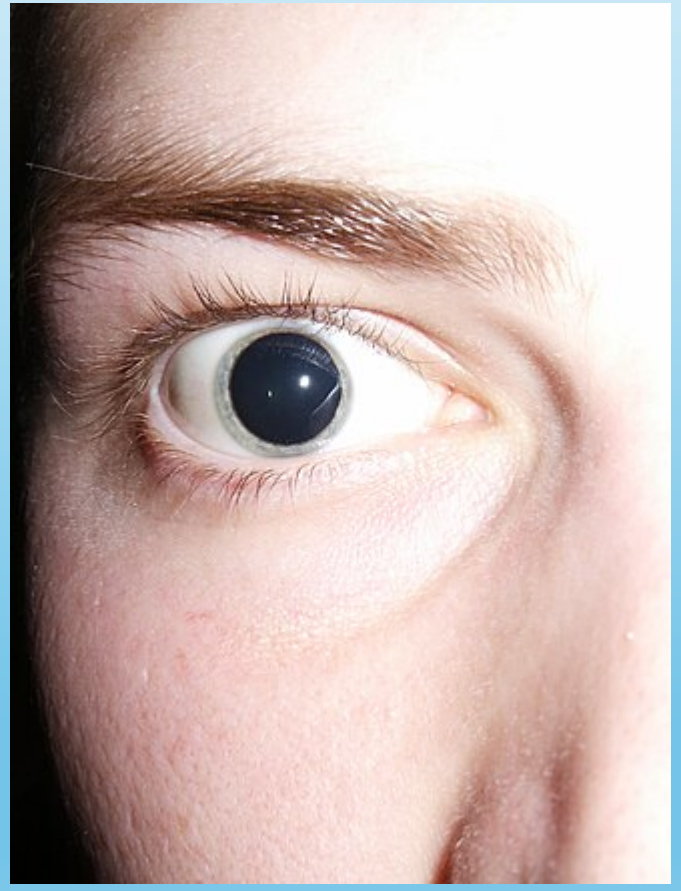
- G: Cônes – 3 min
- D: Combiné

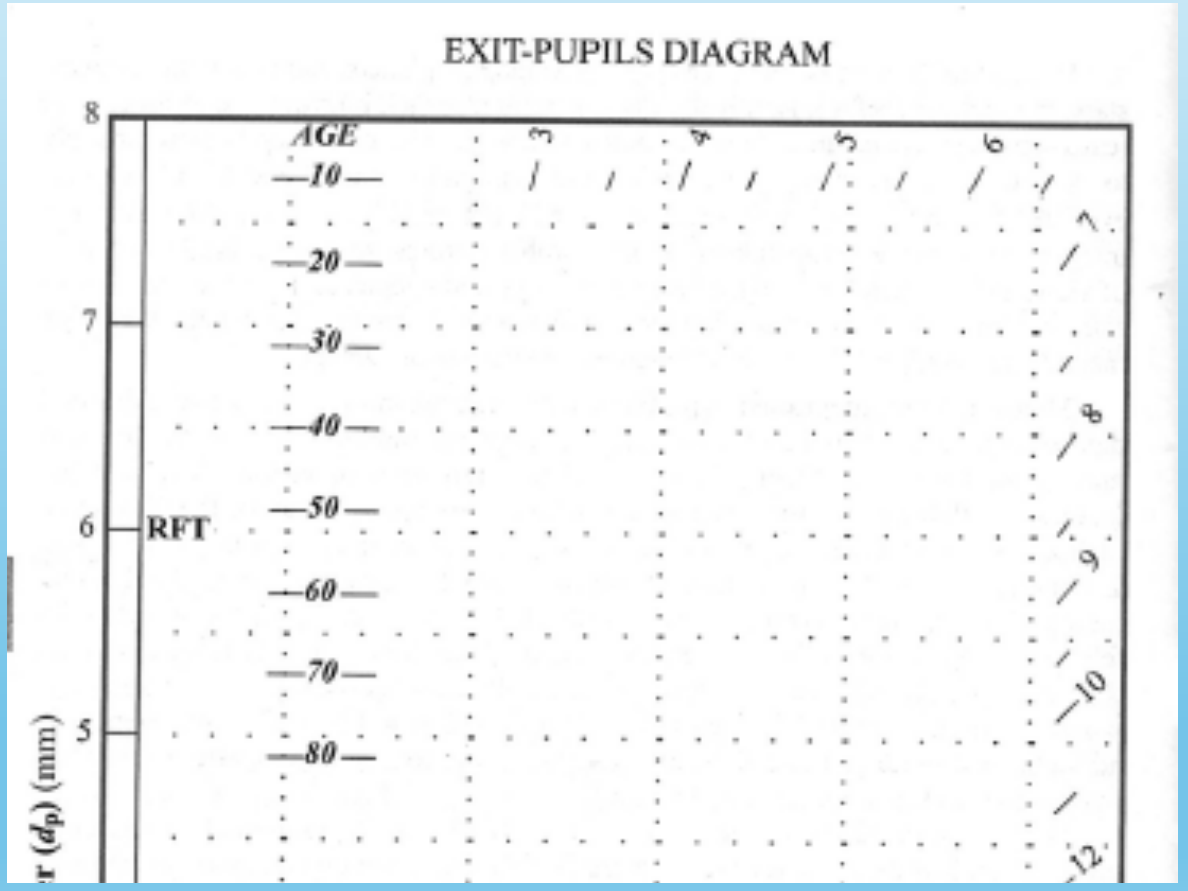
  -> 30 min



- Hecht 1937

Âge et pupille en mydriase





Aberration sphérique (1880 – 1910)

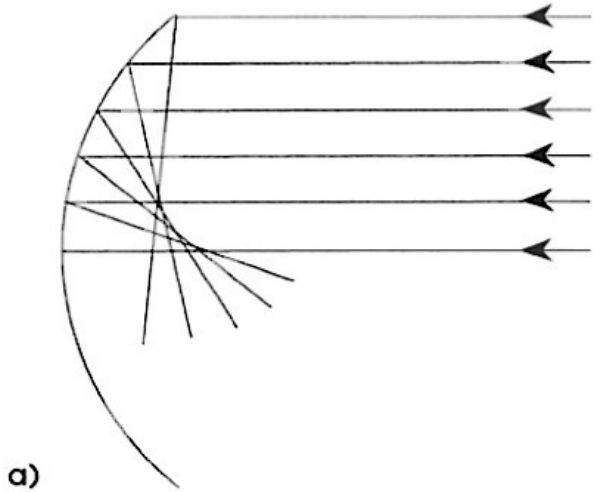
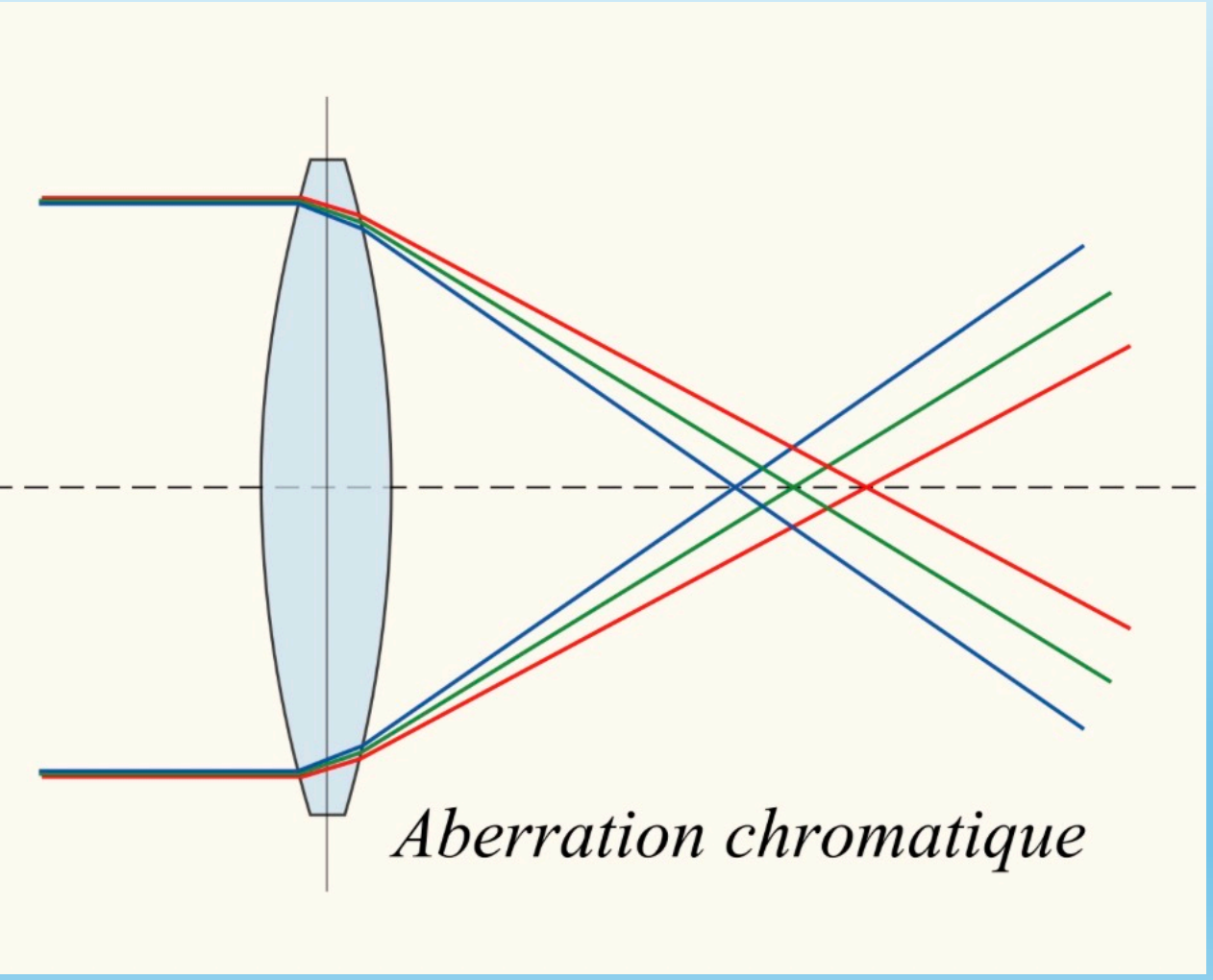
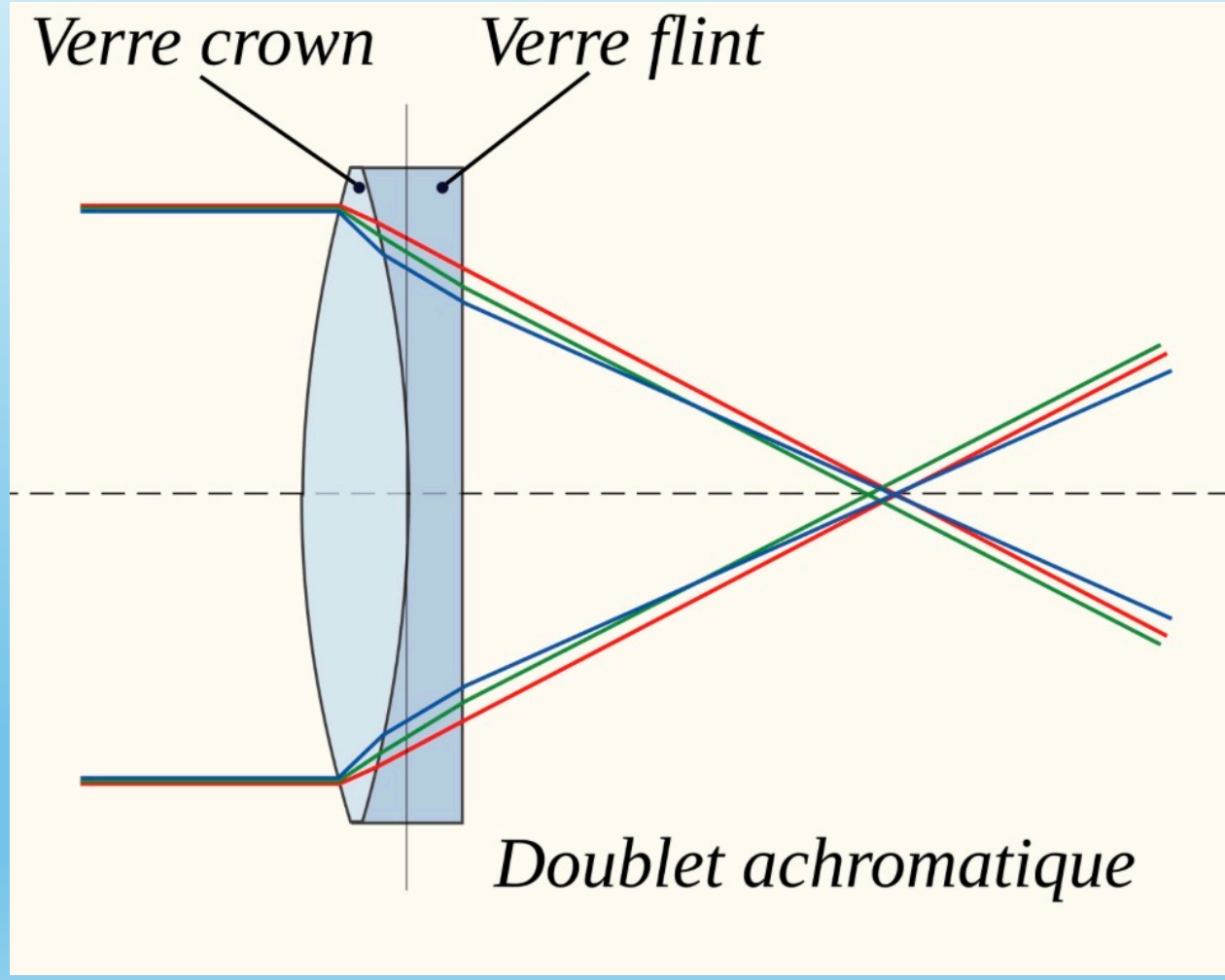


Fig. 2.6 Spherical aberration in reflectors (a) and refractors (b).

Aberration chromatique (1940)



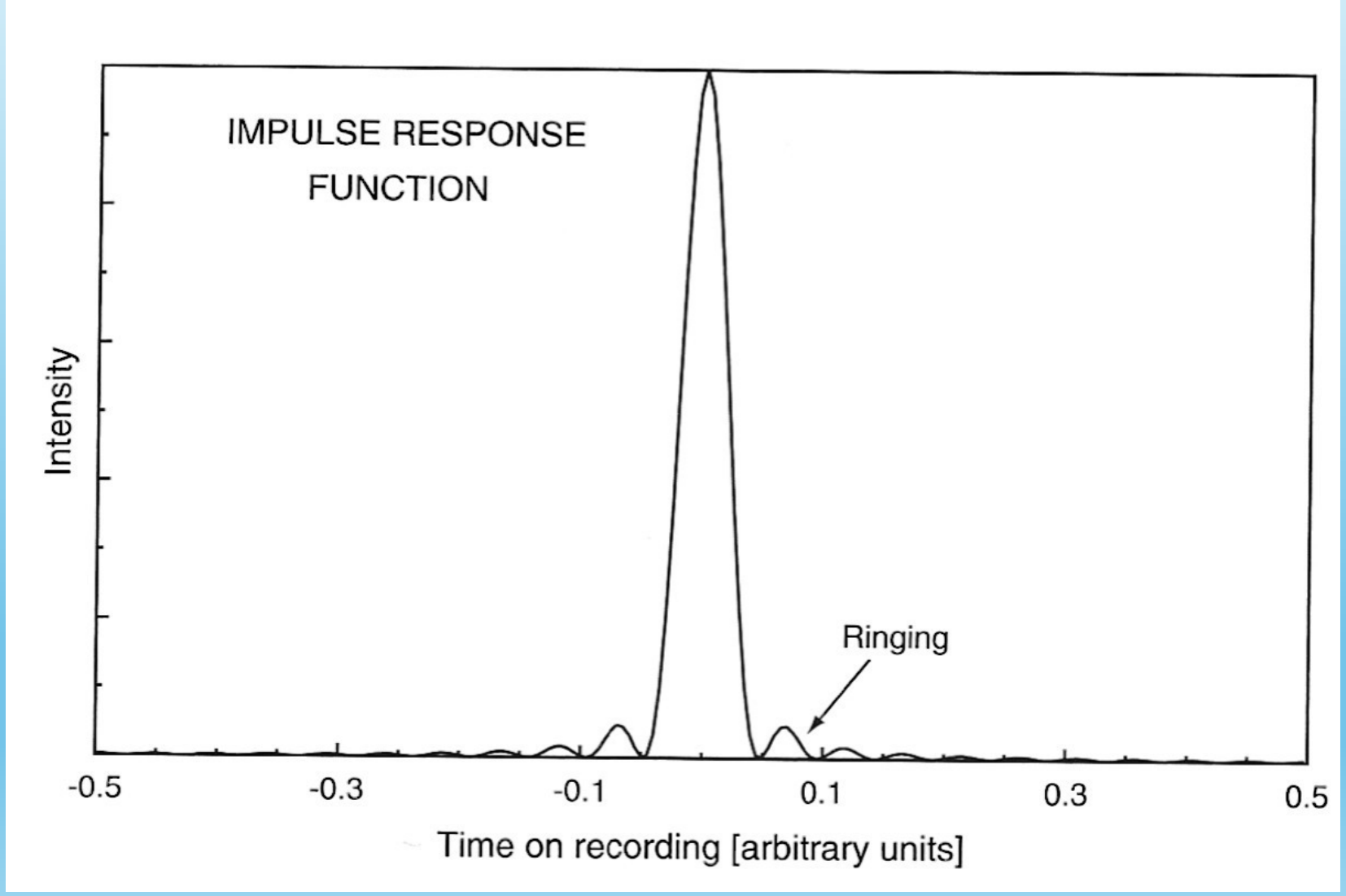


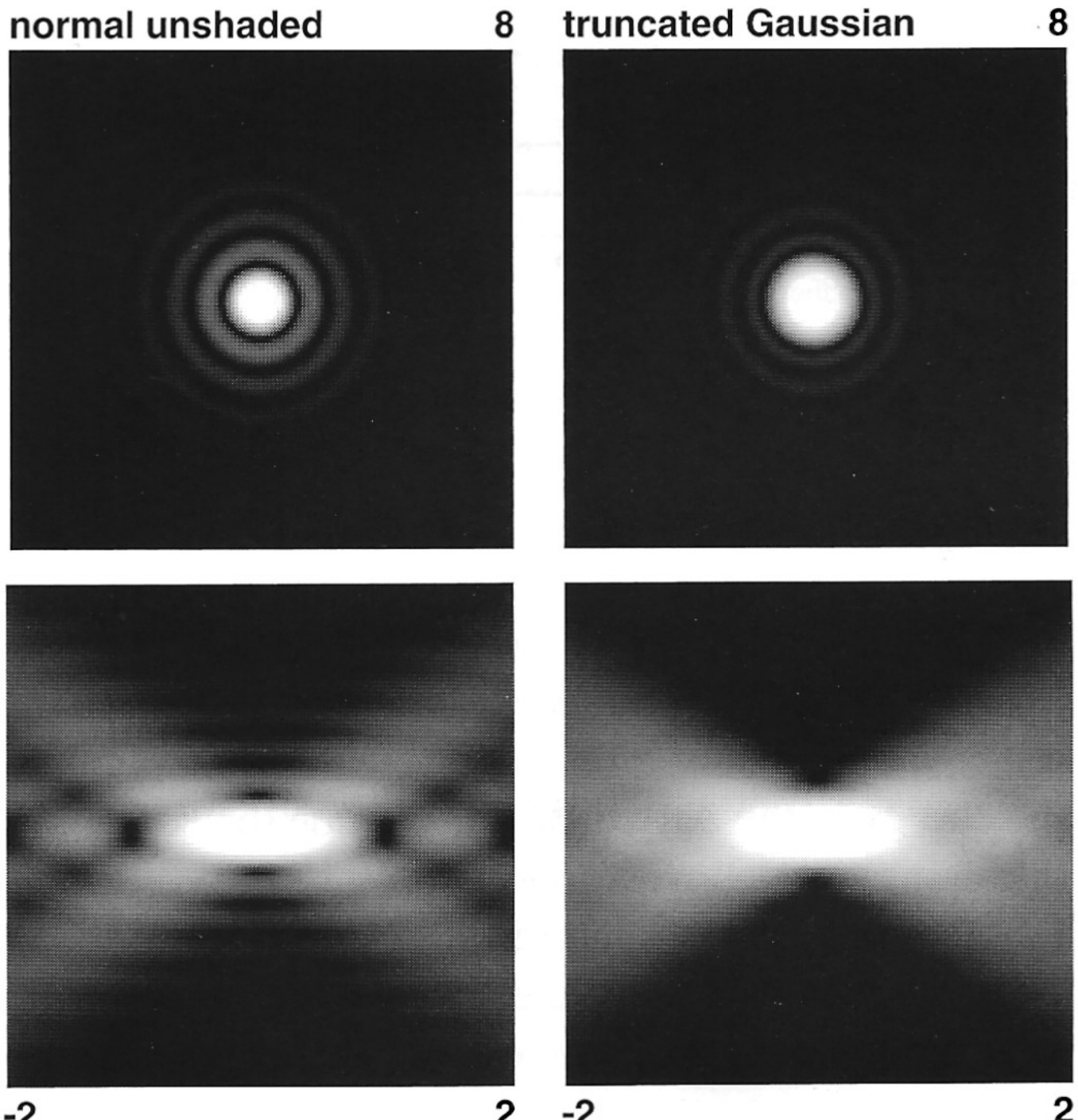
Accomodation
(théorie acceptée depuis 1940)

- Total jusqu'à 5 dioptries négatives
- Moyenne 1-2 D
- Chromatique 0.2 – 0.5 D
- Sphérique 0.3 D

- En relation avec le foyer de repos
- Difficile à évaluer sans appareil spécialisé
- Absent chez porteur de lentille de cristallin !

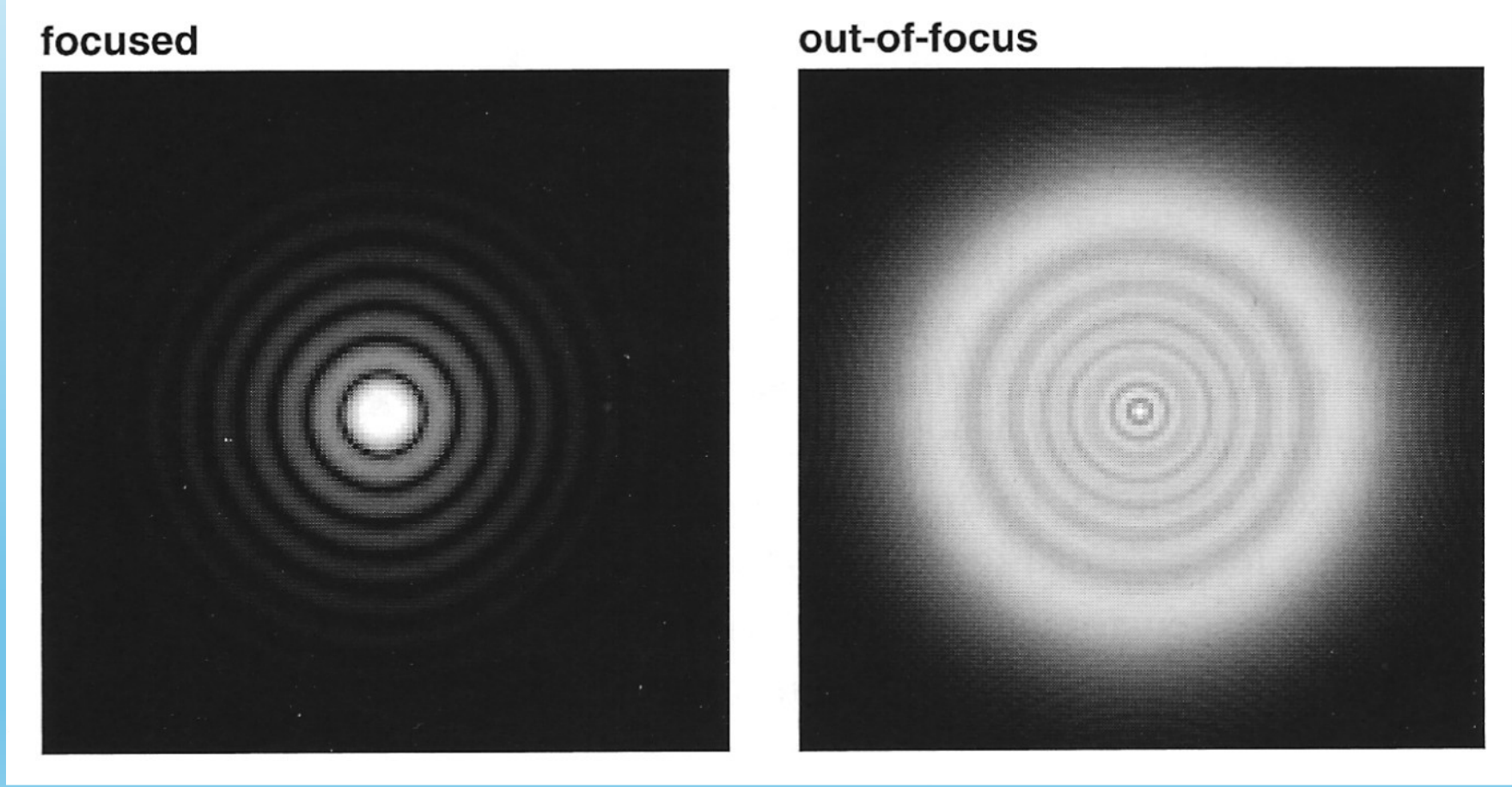
Transmission d’un point filtré



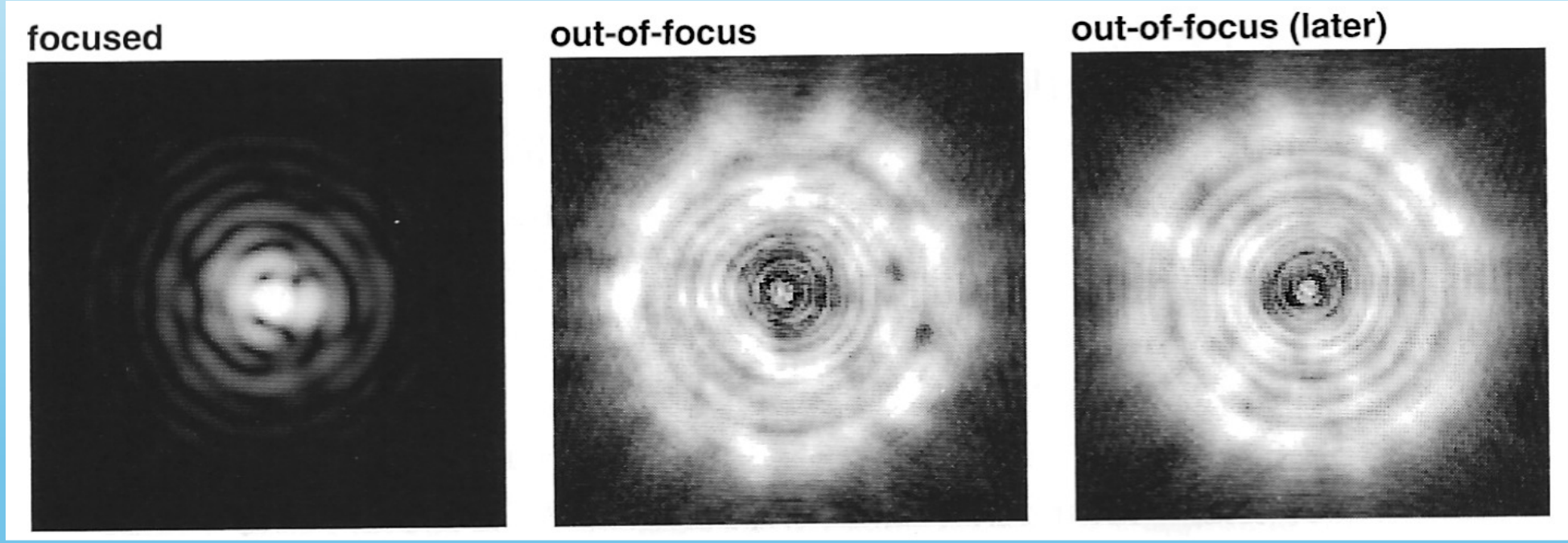

normal unshaded
8
truncated Gaussian
8
-2
2
-2
2

Effet de foyer

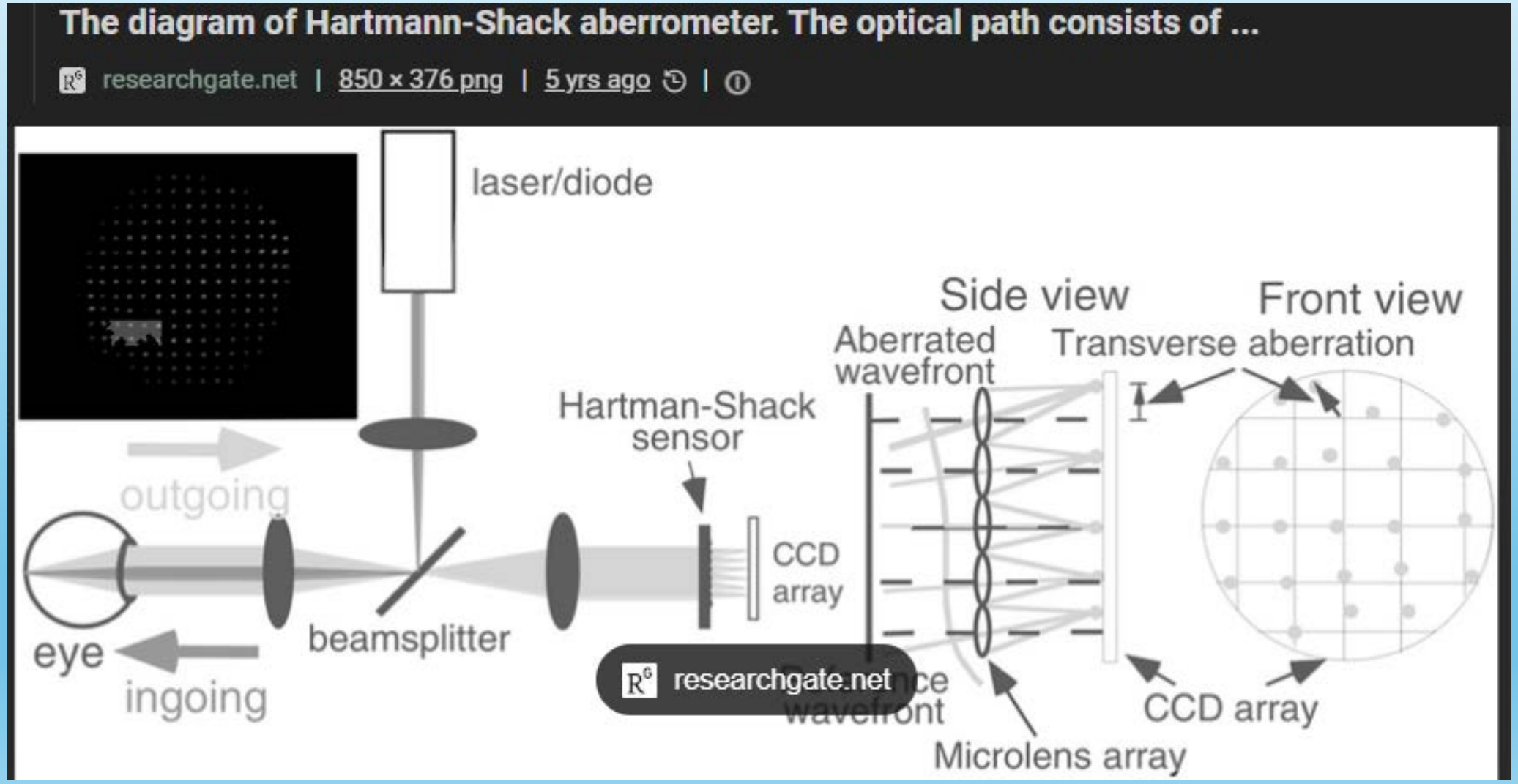
(Image de gauche 4x d'intensité)



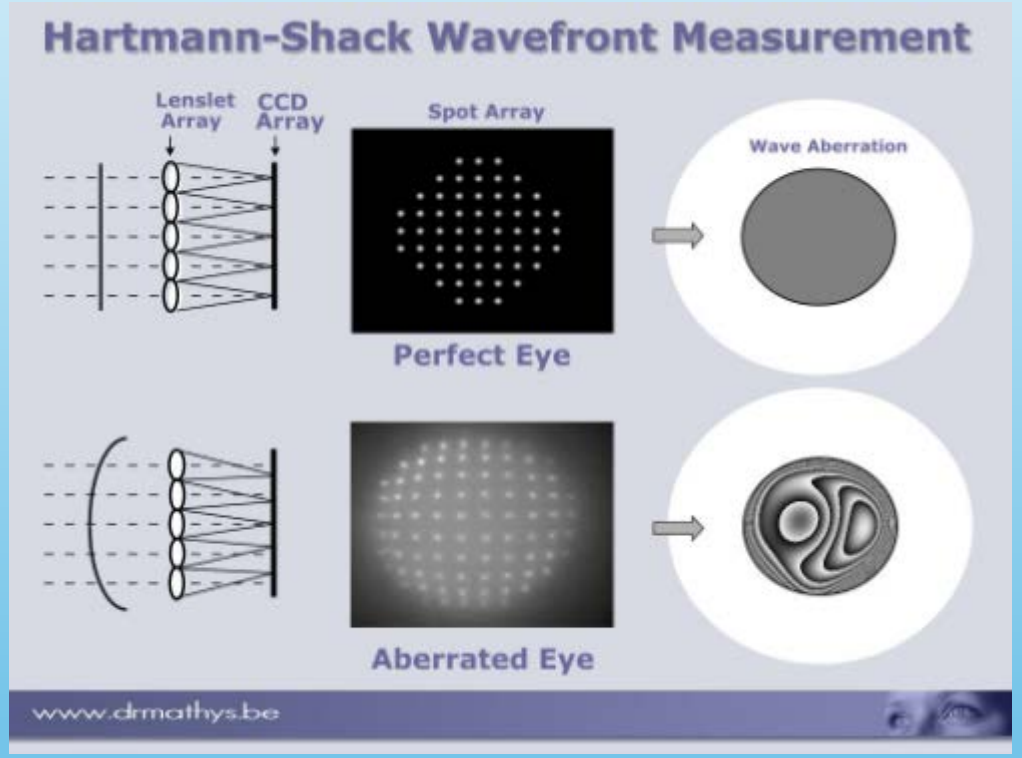
Effet de la turbulence

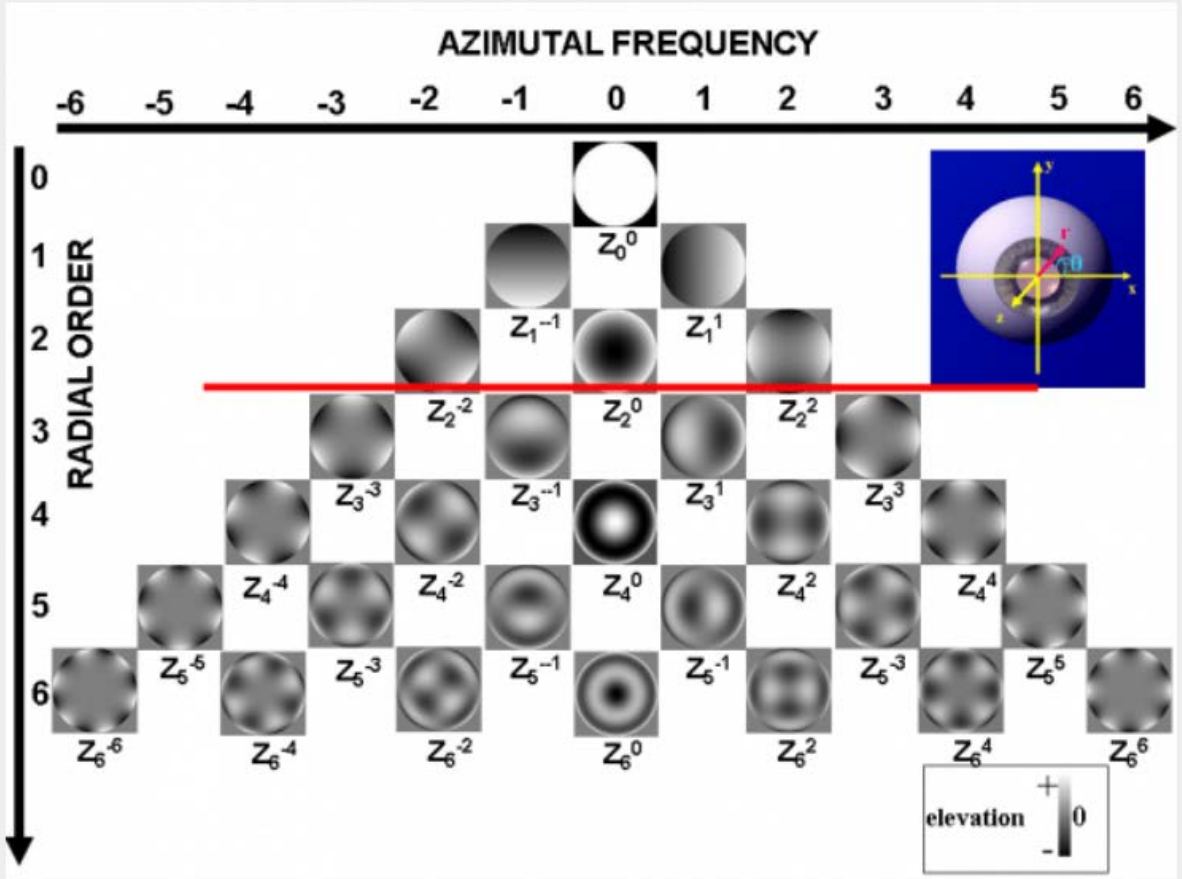


Appareils de Clinique…



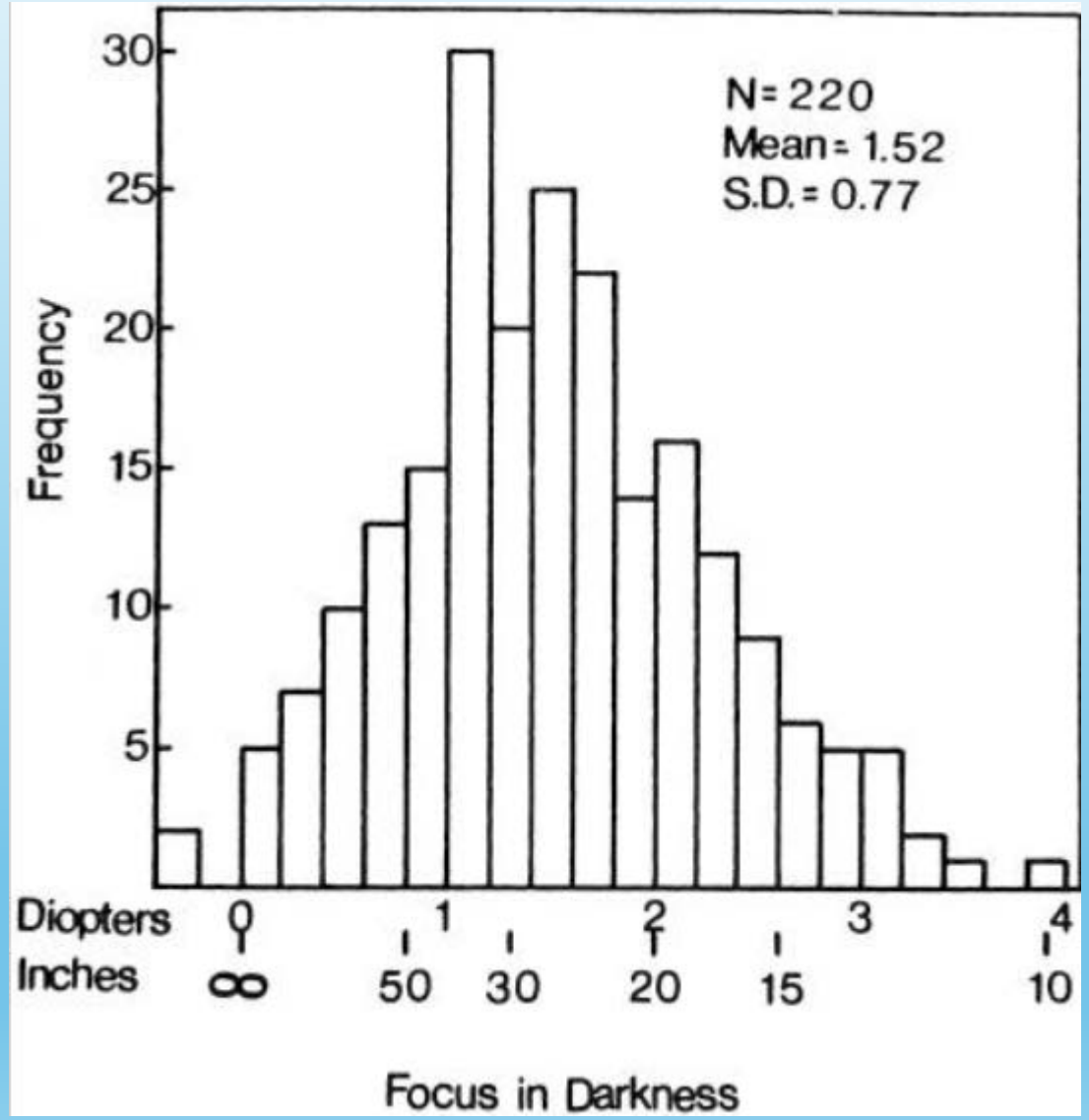
Solutions…



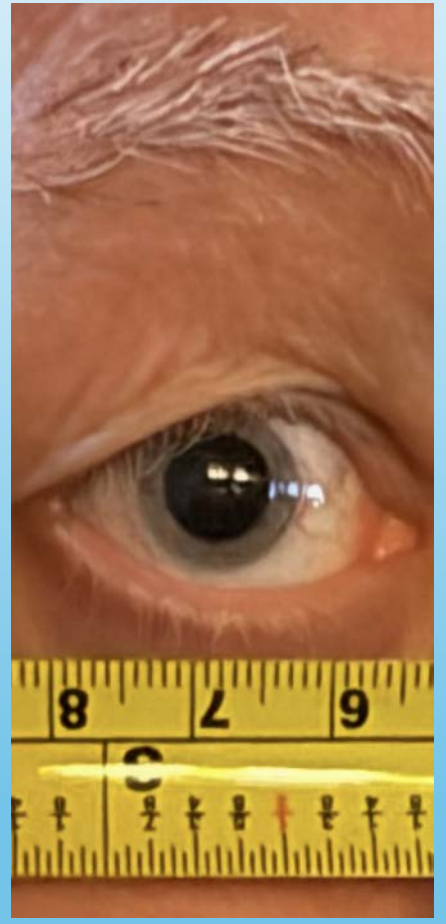


Les aberrations optiques de haut degré ont un degré radial supérieur à 2 (degré 3, 4 et plus). La classification des aberrations de haut degré exprimées comme des termes de Zernike permet leur représentation sous forme de pyramide. Ici, les aberrations de haut degré sont représentées jusqu'à l'ordre 6.

1975…Concept du foyer d’obscurité

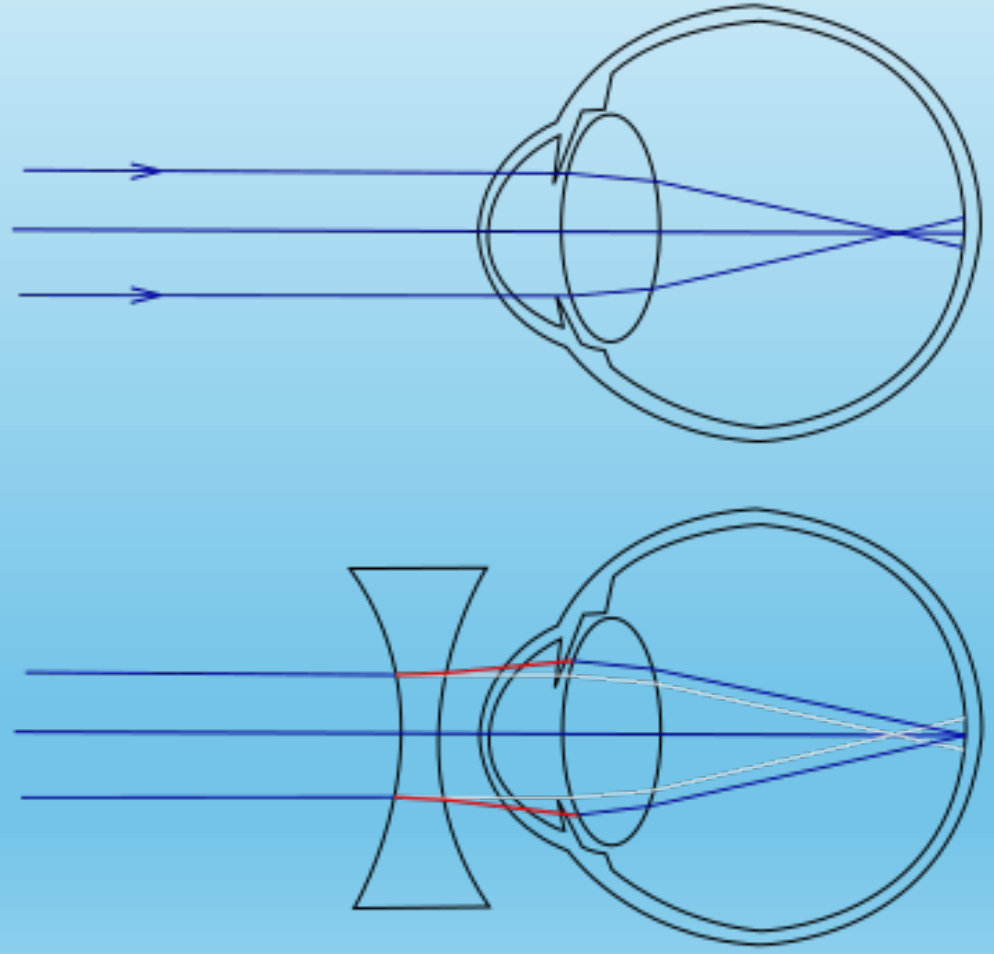


Leibowitz and Owens, 1978

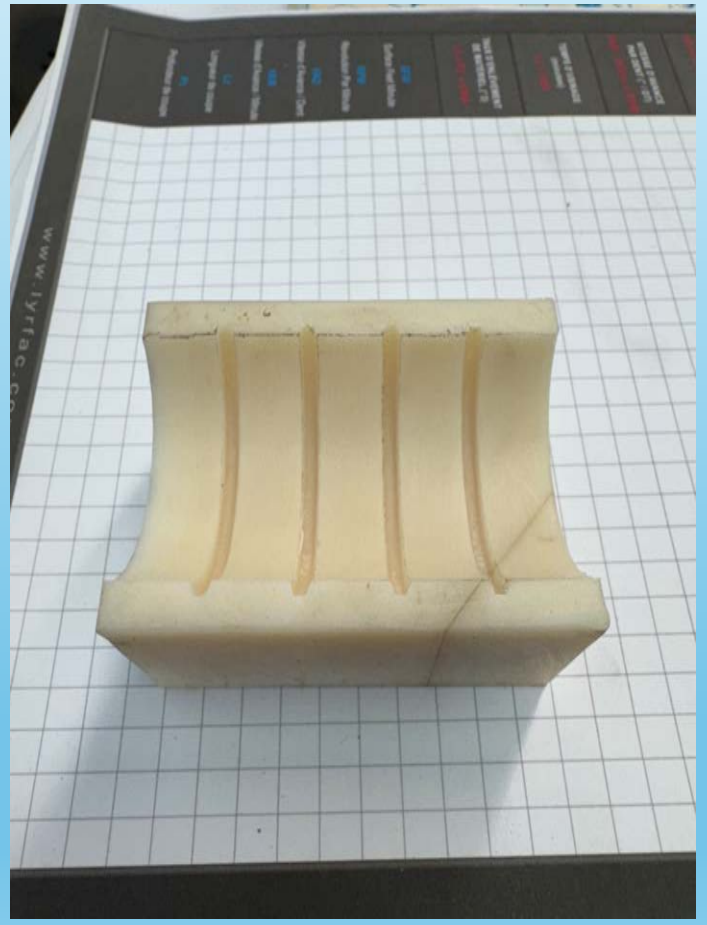


33 cm, -3 D
-O- 7.2 mm (/ 11.5)

Correction par lentille sur le site d'observation



Confection de support de lentilles





Support et lentilles divergeantes

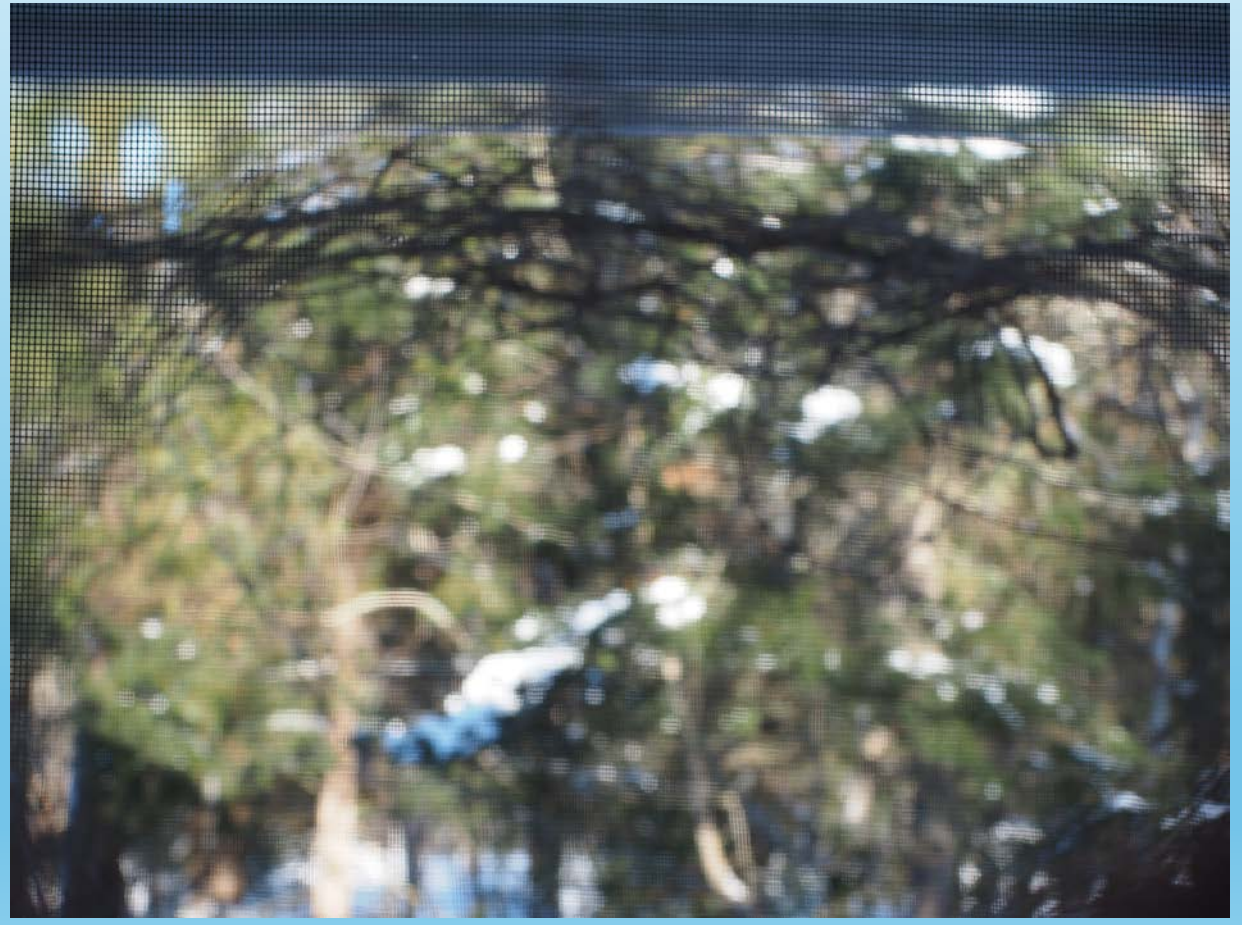




Foyer de près



Foyer intermédiaire



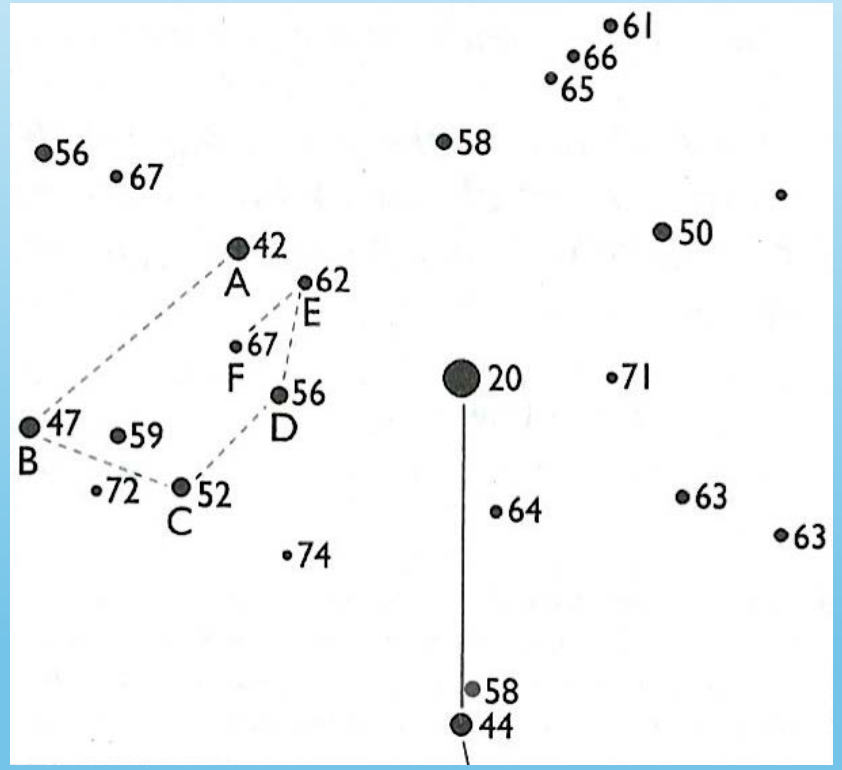
Correction avec lentilles de 2D



Décompte par magnitude entière (données observationnelles)

Basé sur le **Yale Bright Star Catalogue** et analyses compilées :

Magnitude	Nombre d'étoiles	Cumul
-1 à 0	~15	15
0 à 1	~7	22
1 à 2	~49	71
2 à 3	~119	190
3 à 4	~420	610
4 à 5	~1,319	1,929
5 à 6	~4,017	5,946



D. Pitcairn, RASC 2026, p.68

Questions ?

