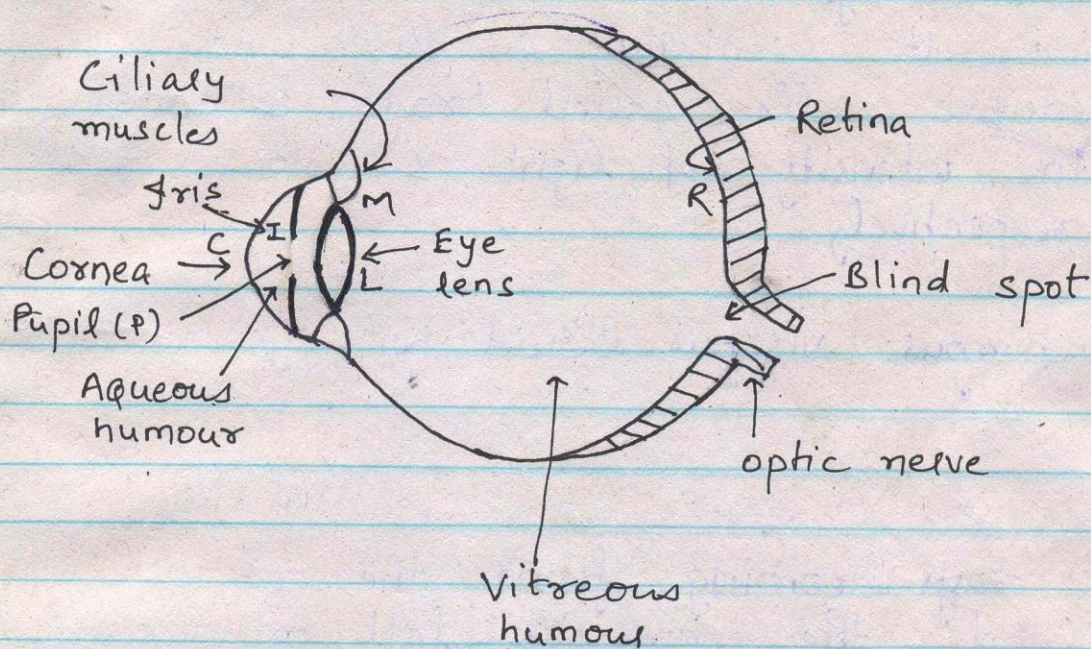


Optical Instruments

Human eye



Construction

- ① Cornea - It is the front part of the eye. It is made of a transparent substance & is bulging outwards.
- ② Iris - It is just behind the cornea. It regulates the amount of light entering the eye by adjusting the size of the pupil.
- ③ Pupil - It is a hole in the middle of iris.
- ④ Eye-lens - It is a convex lens made of a transparent & flexible material (of proteins).
- ⑤ Ciliary muscles - It holds the eye-lens &

helps in changing the focal length of the eye-lens.

⑥ Retina - It is behind the eye & at the back part of the eye. The image is formed at the retina. It contains a large no. of light sensitive cells called 'rods' & 'cones' which respond to intensity of light & colour of objects respectively.

⑦ Aqueous humour - viscous liquid betⁿ eye-lens & cornea.
Vitreous " " " " " " retina.

Working

- i) The light rays coming from the object enter the pupil of the eye & fall on eye-lens.
- ii) The eye-lens converges the light rays & produce a real & inverted image of the object on the retina.
- iii) The image formed on the retina is conveyed to the brain by the optic nerve & gives rise to the sensation of vision.

Persistence of Vision

The ability of an eye to continue to see the image of an object for a very short duration even after the removal of the object is called persistence of vision.

Note - If the sequence of still picture taken by a movie camera is projected @ of about 24 images ^{per sec.} on the screen, then the successive impression of images appear to merge smoothly

Accommodation

The ability of an eye to focus the distant objects as well as the nearby objects on the retina by changing the focal length of its lens is called accommodation.

A normal eye can accommodate for all distances betⁿ ∞ (far point) & about 25 cm (near pt.).

The power of accommodation of normal eye is about 4 dioptre.

Some Imp Questions

Q1. Why does it take some time to see objects in a dim room when you enter the room from bright sunlight outside?

Ans In the bright sunlight the pupil of our eye is very small. Now, when we enter a dim room, the pupil has to expand & become bigger to allow more light to enter the eyes. This adjustment of pupil takes some time & so it take ----- outside.

Q2. A chicken can see only in bright light. Why?

Ans Due to lack of rod shaped cells in its retina.

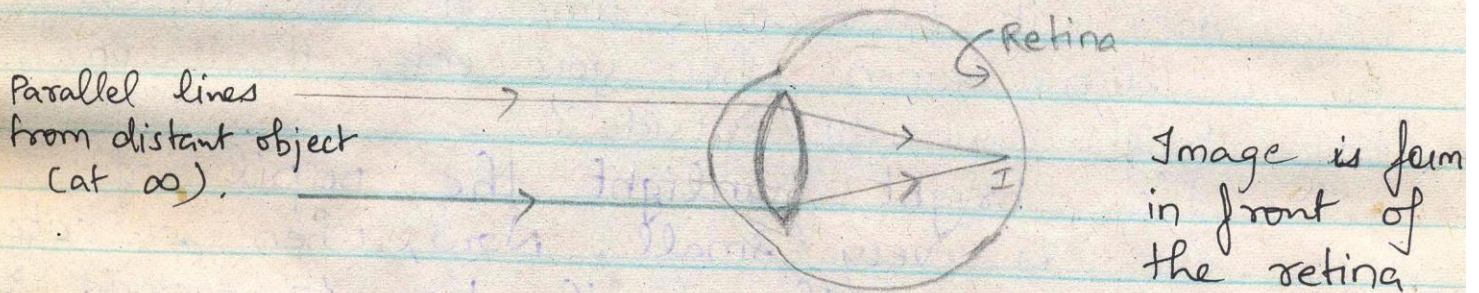
Defects of Eye

① Myopia (Short-sightedness)

It is that defect of the eye (due to which) in which a person can see nearby objects clearly but cannot see the far objects clearly.

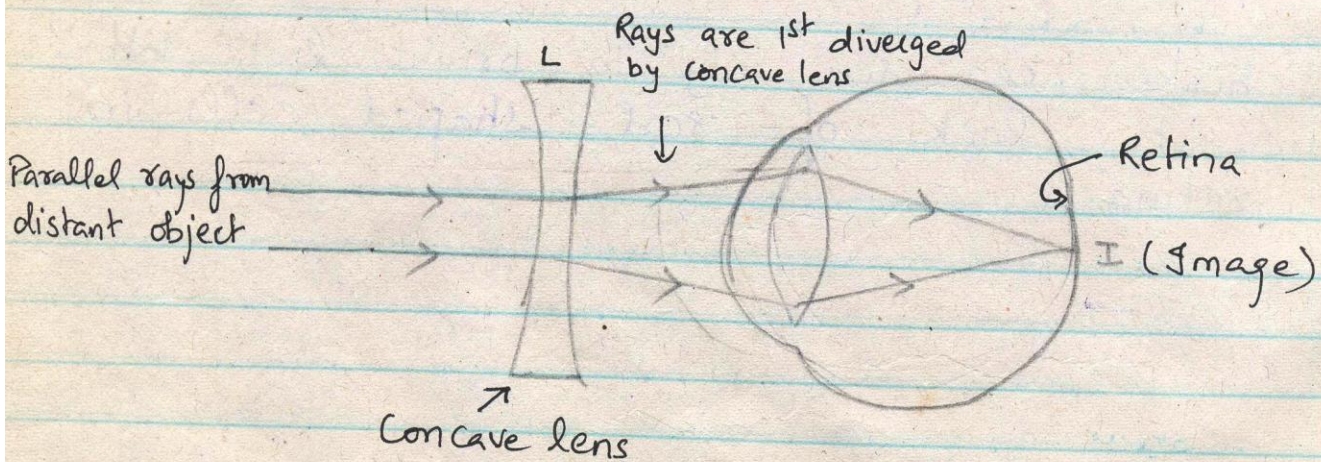
Causes

- i) excessive curvature of cornea or high converging power of eye-lens.
- ii) elongation of eye-ball.



Correction

It can be corrected by using a concave (diverging) lens.

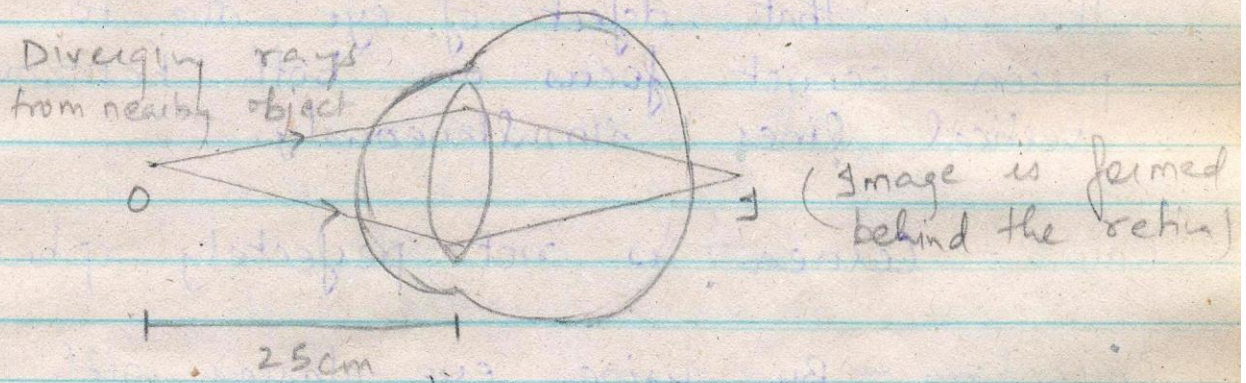


② Hypermetropia (Long-sightedness)

It is that defect of the eye in which a person can see distant objects clearly but can't see the near objects clearly.

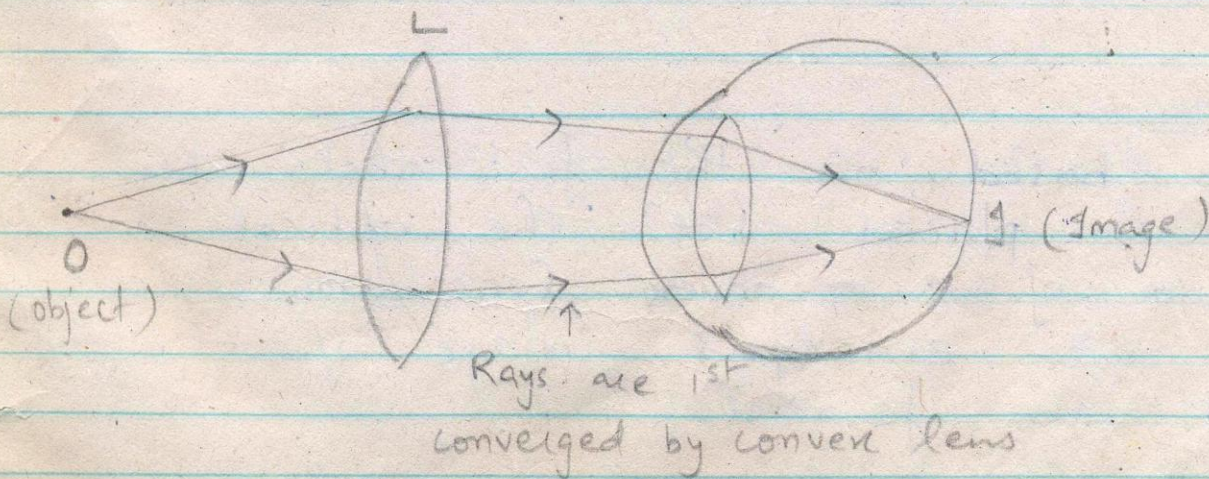
Causes

- i) the focal length of eye-lens is too great
or
low converging power of eye-lens.
- ii) eye-ball is too short.



Correction

It can be corrected by using a convex (converging) lens.



(3) Presbyopia

It is that defect of eye due to which an old person cannot read comfortably and clearly without spectacles.

Cause - 1. gradual weakening of ciliary muscles.
2. diminishing flexibility of crystalline lens.

Correction - By using a bi-focal lens.

(4) Astigmatism

It is that defect of eye due to which a person cannot focus on both horizontal & vertical lines simultaneously.

Cause - Cornea is not perfectly spherical.

Correction - By using eye-glasses with cylindrical lenses.

#For complete notes go to

<http://anilyadav1882.weebly.com/term-ii2.html>