The Human Eye and Vision 1
(Producing The Image)
In this section . . .

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- Image formation by human eye
- Method of light detection
- Retinal processing
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Human Visual System

- Image formation
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  - Lens

- Exposure Control
  - Iris/pupil
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- Detection
  - Retina
  - Rods
  - Cones

- Processing
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Human Eye

Human eye is a complete imaging system.
The curved surfaces of the eye focus the image onto the back surface of the eye.
The outer wall of the eye is formed by the hard, white sclera.
Cornea is the clear portion of the sclera.
2/3 of the refraction takes place at the cornea.
Iris and Pupil

- Colored iris controls the size of the opening (pupil) where the light enters.
- Pupil determines the amount of light, like the aperture of a camera.

Iris open
Dilated pupil

Iris closed
Constricted pupil
Lens

- **Eye lens** is made of transparent fibers in a clear membrane.
- Suspended by suspensory ligament.
- Used as a fine focusing mechanism by the eye; provides 1/3 of eye’s total refracting power.
- Non-uniform index of refraction.
Accommodation

The suspensory ligaments attach the lens to the ciliary muscle.

When the muscle contracts, the lens bulges out in the back, decreasing its focal length.

The process by which the lens changes shape to focus is called accommodation.
Aqueous Humor and Vitreous Humor

- Transparent gelatinous liquid filling the eye.
- Provides nutrients to the cornea and eye lens.
- Also helps maintain the eyeball shape with its pressure.
Retina is the photosensitive “detector” for the eye.

Two types of receptors in the retina: rods for low light level, and cones for color.

Located at the center of the retina, fovea contains a greater concentration of cones.

Signals from the receptors leave through the optic nerve to the brain.