

# Aperture, Exposure, and Equivalent Exposure

# Aperture

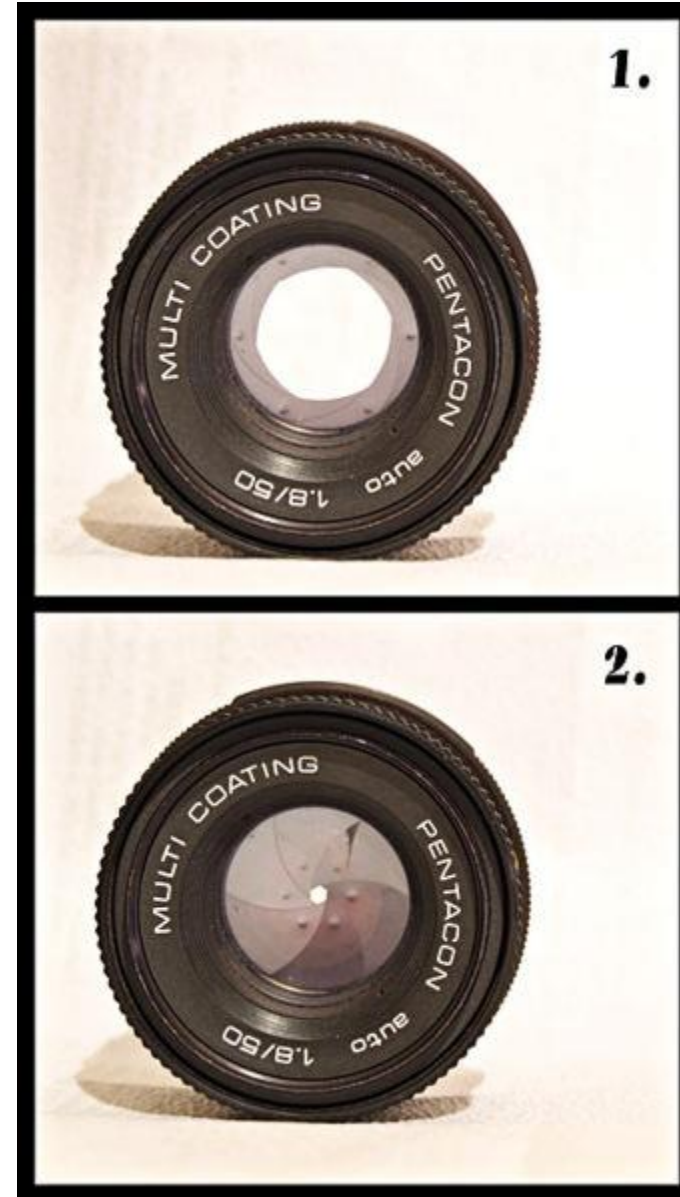
Also known as f-stop

# Aperture

Controls opening's size during exposure

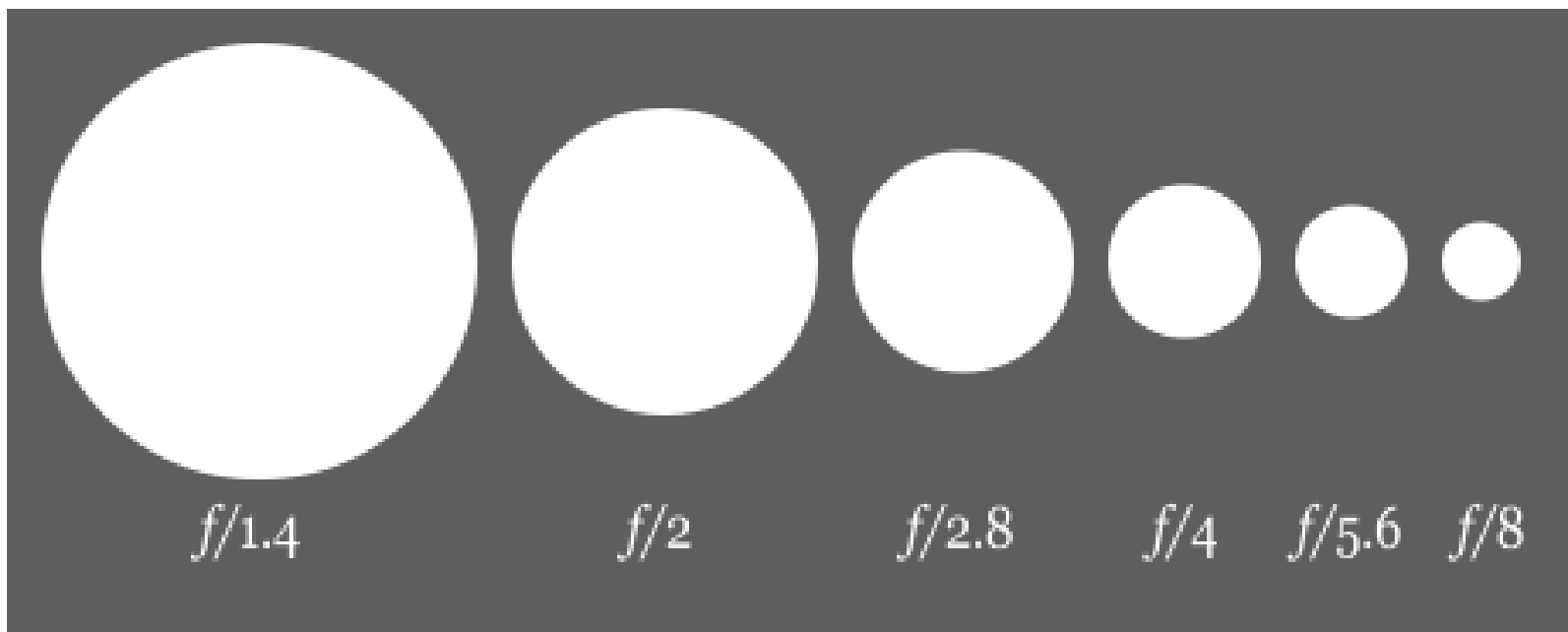
Another term for aperture: **f-stop**

Controls Depth of Field



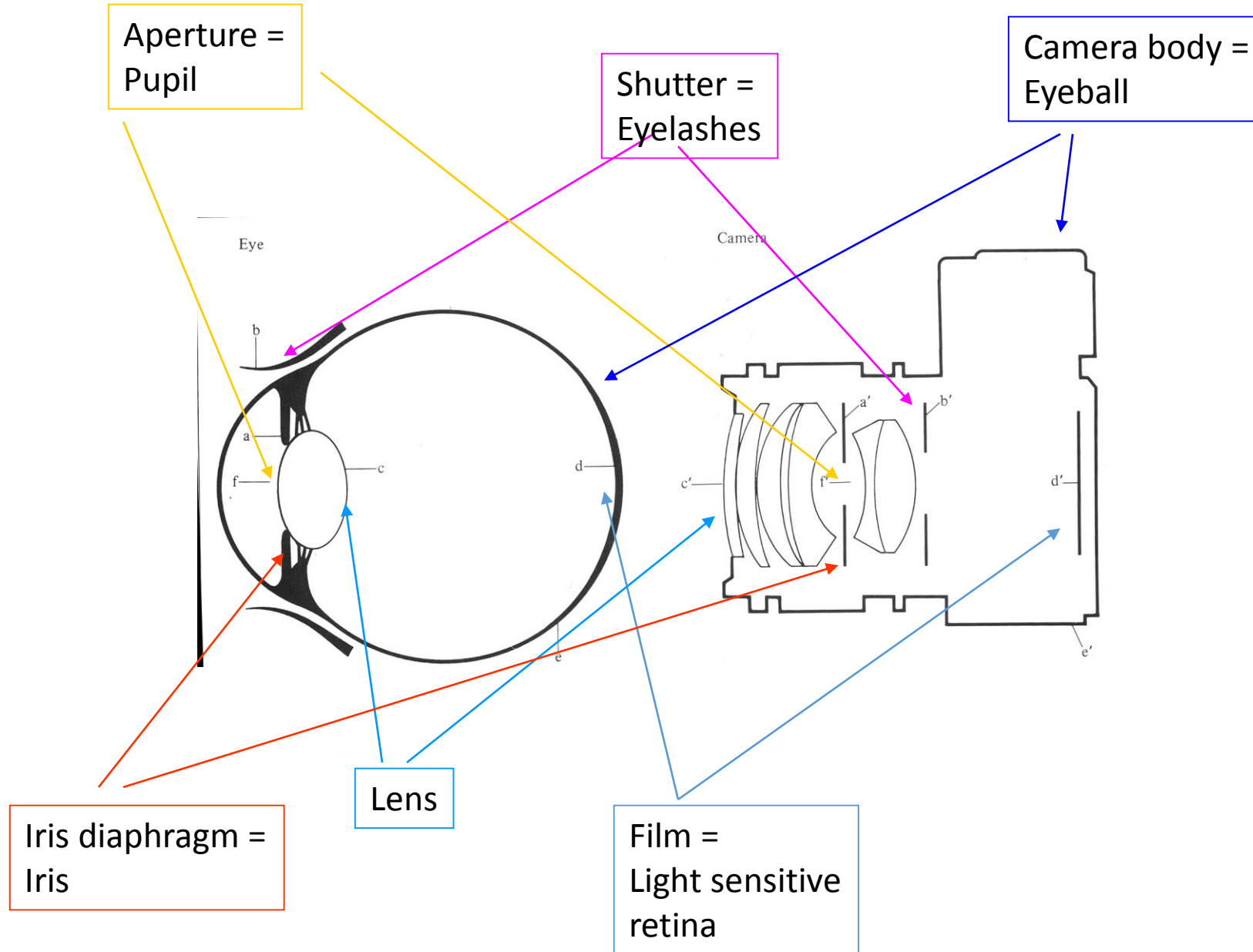
Each full stop on the aperture (f-stop) either doubles or halves the amount of light let into the camera

Light is halved this direction



Light is doubled this direction

## The Camera/Eye Comparison



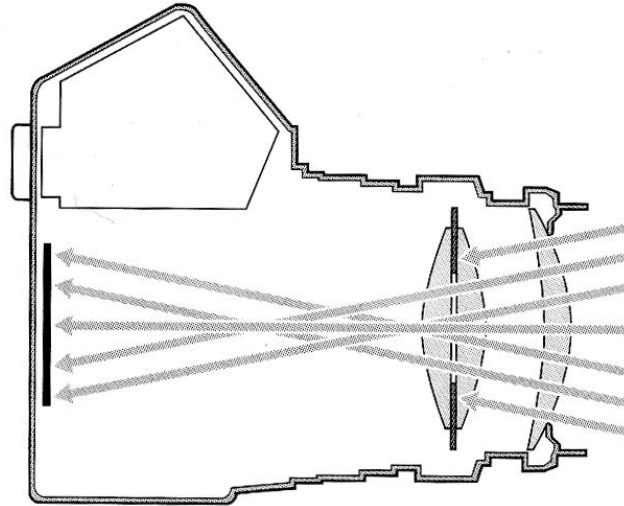
# Aperture and Depth of Field

# Depth of Field

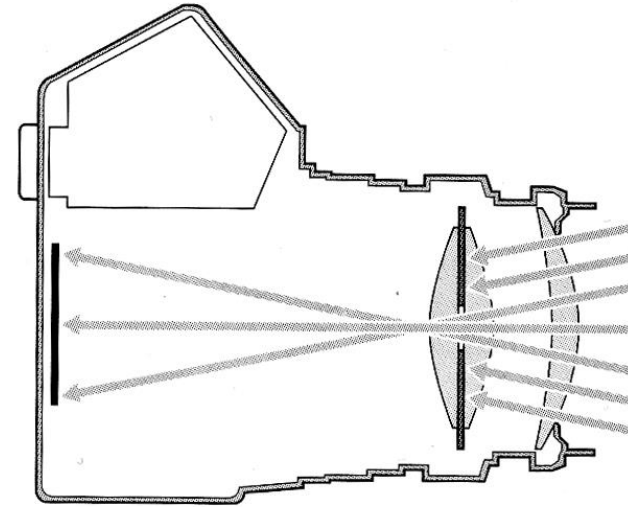
- The zone of sharpness variable by aperture, focal length, or subject distance

in infinity, the same focus or  
distance for that aperture. The  
scales on a lens barrel  
hyperfocal distance opposite  
you are using. If you then  
the depth of field will  
ce to infinity.◁ For  
amera has a hyperfo  
e focus at 18 feet,

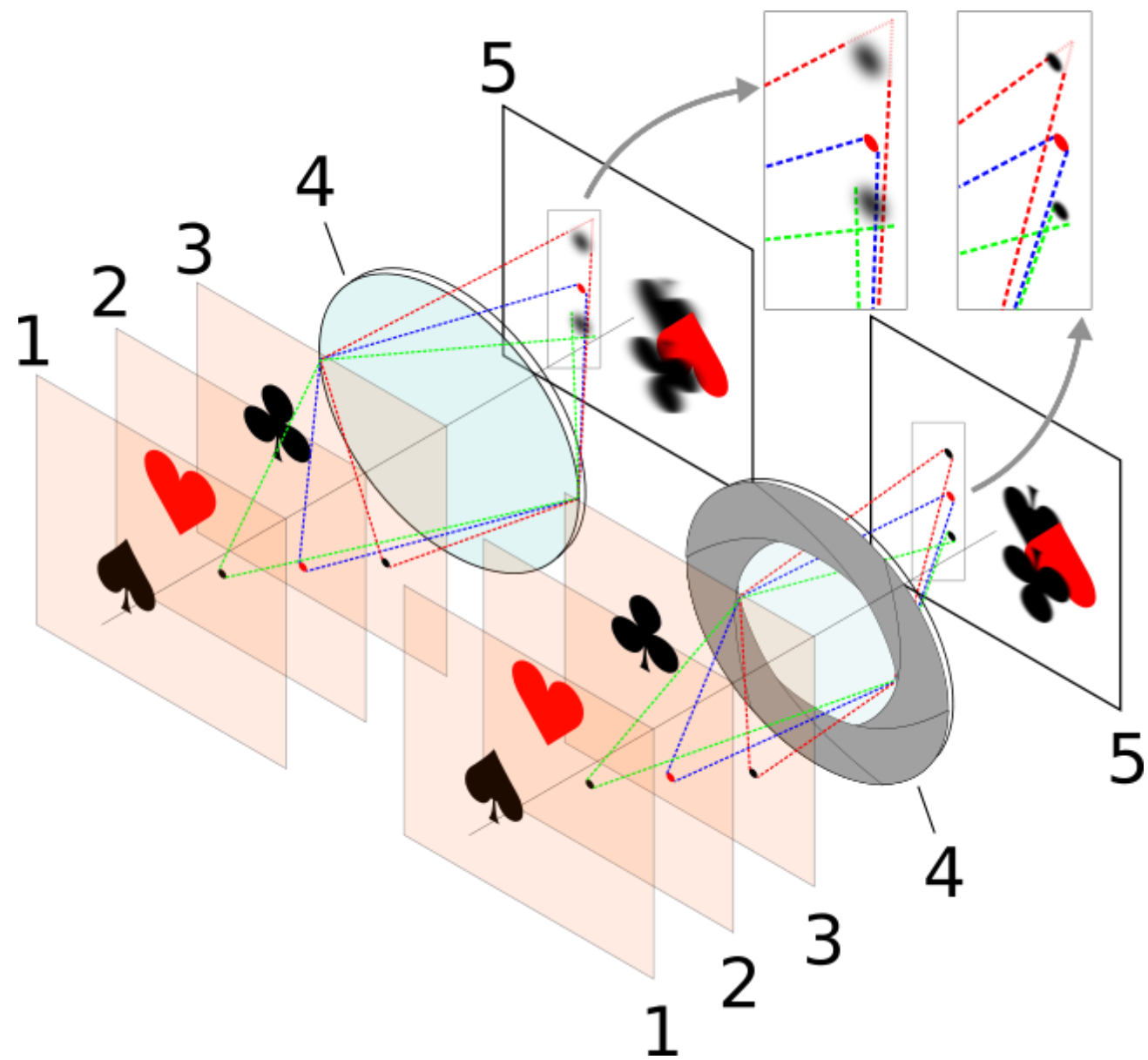
## Aperture and Scattered Light Rays

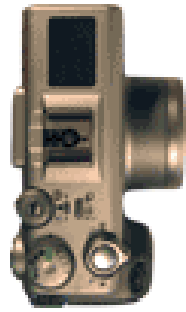


Wide Aperture



Small Aperture





← Depth of Field →



f/22



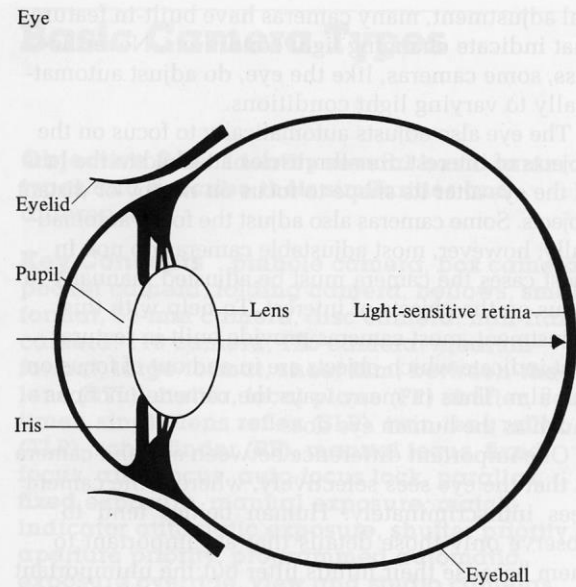
f/8



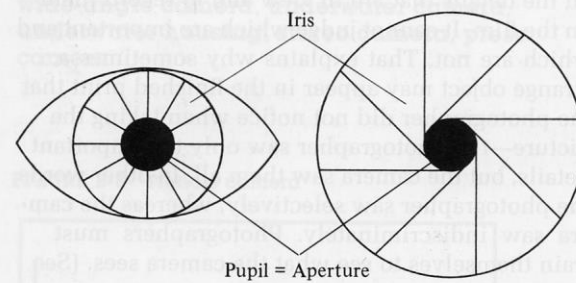
f/4



f/2

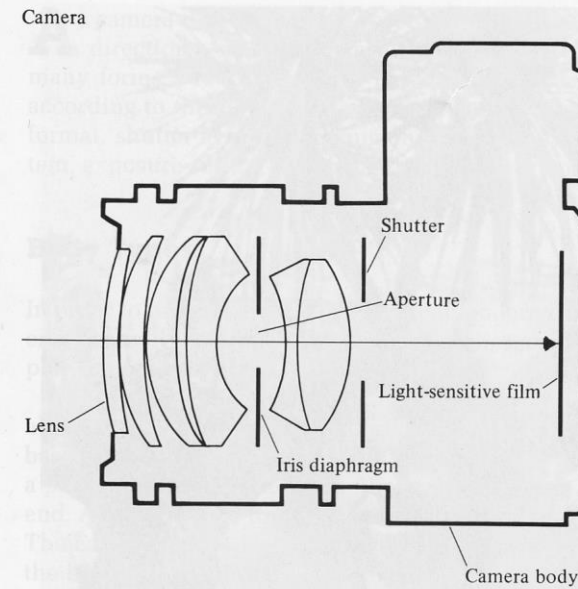


A

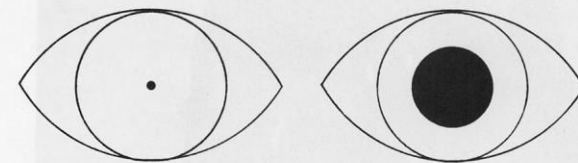


B

**FIGURE 2-1 EYE AND CAMERA.** A. Notice the similarity of structures. B. The iris of the eye regulates the size of the pupil opening. The aperture setting on the camera determines how the iris diaphragm regulates the size of the lens opening (aperture). C. Actual appearance of small and large apertures.



Camera



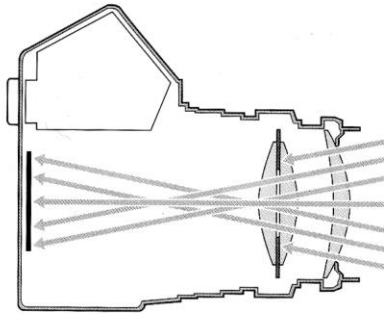
C



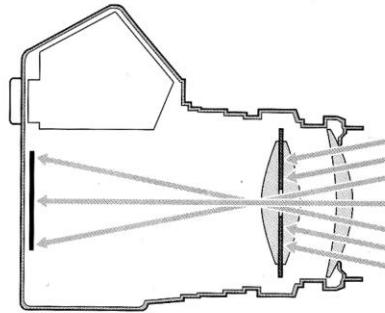
Small aperture opening

Large aperture opening

### Aperture and Scattered Light Rays



Wide Aperture

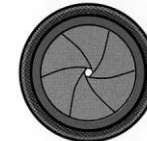


Small Aperture

### Depth-of-Field Factors

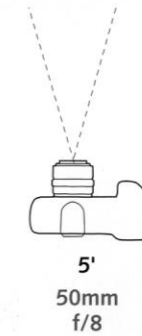
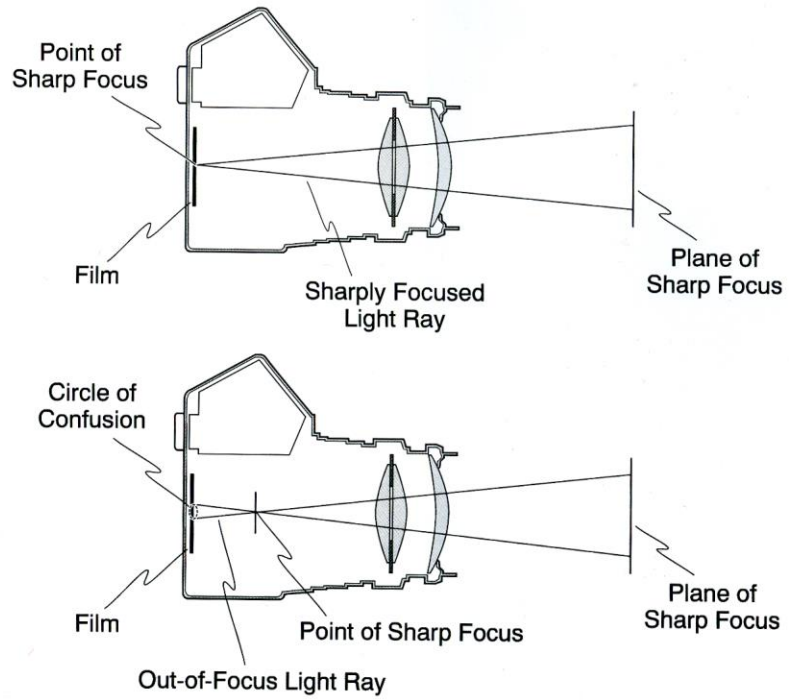


f/2  
50mm  
2' away



f/22  
50mm  
2' away

## Points of Focus and Circles of Confusion



# Large Depth of Field



Shot at f/22

**Jacob Blade**



Shot at f/64

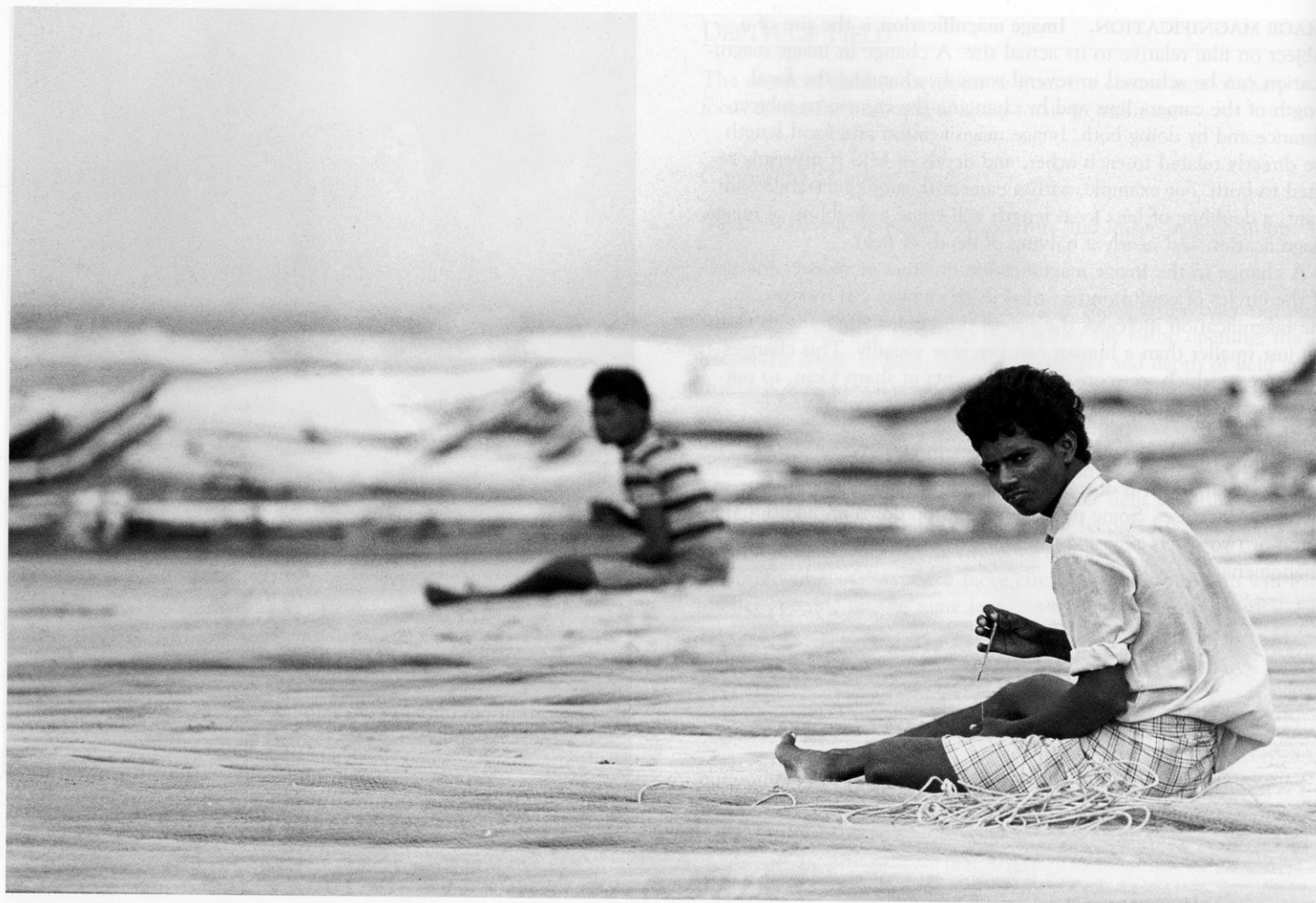
**Ansel Adams**

# Shallow Depth of Field

Shot at f/4



Keely Nagel



Madras, India  
David Litschel

Shot at f/5.6



How is a darkroom test strip like a camera's light meter?



They both tell **how much light** is being  
allowed into an exposure and  
**help you to pick the correct amount of**  
**light**  
using your **aperture** and proper **time**  
(either timer or shutter speed)

This is something called  
Equivalent Exposure

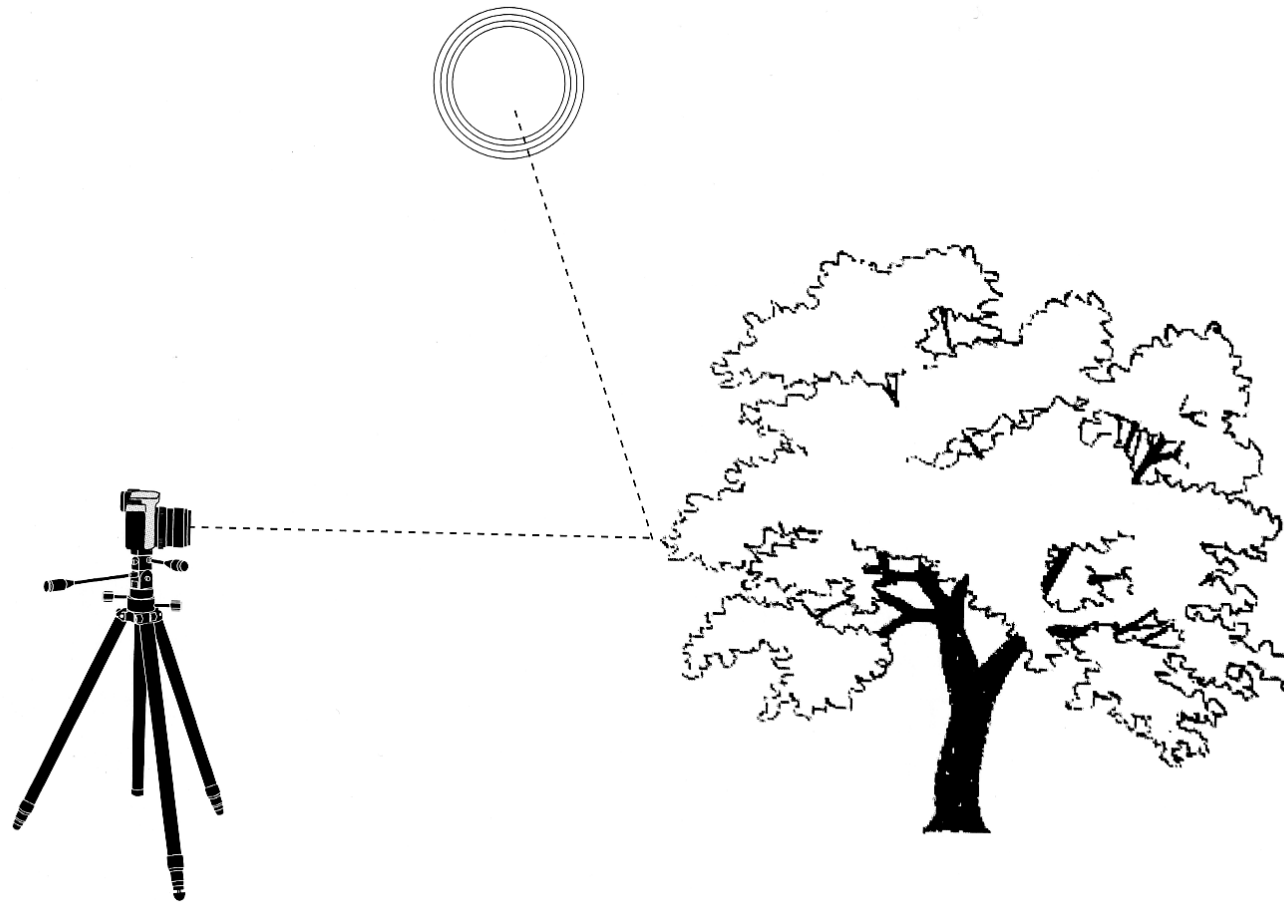
Which will be explained now...

# What we will discuss

- Exposure
- Equivalent Exposure
- Why is equivalent exposure important?

## Photography – Greek

photo = light  
graphy = writing



What is an exposure?

Which one is properly exposed and what happened to the others?



A



B



C

A



Under  
Exposed



B



Over  
Exposed



C



Properly  
Exposed



# Exposure

- Combined effect of ***volume*** of light hitting the film or sensor and its ***duration***.
- ***Volume*** is controlled by the aperture (f-stop)



- ***Duration*** (time) is controlled by the shutter speed



# Equivalent Exposure



Properly  
Exposed



# Objectives of Equivalent Exposure

- To create the proper aperture and shutter speed on the camera given:
  - the light conditions
  - the ISO setting
  - the effect you wish to create (effects might include, shallow or large depth of field, blur or freeze motion)

# Equivalent Exposure

- denotes all combinations of shutter speed and relative aperture settings that give the same amount of light striking the light sensitive surface

# Equivalent Exposure

- Given that your light is constant,
- If you:
  - increase shutter speed (less light)  
you must open up aperture (more light) the same amount of stops
  - decrease shutter speed (more light)  
you must close down aperture (less light) the same amount of stops

# **Why is Equivalent Exposure important?**

- To expose your film properly (not too light or too dark)
- As you shoot in different light conditions or shoot for different effects you must change your apertures and shutter speeds accordingly

Shutter Speeds		Apertures	
Fractions of seconds		Fractions	
<div><div>↑</div><div>More Light</div><div>↓</div><div>Less Light</div></div>	1	<div><div>↑</div><div>Less Light</div><div>↓</div><div>More Light</div></div>	f/22
	2		f/16
	4		f/11
	8		f/8
	15		f/5.6
	30		f/4
	125		f/2.8
	250		f/1.7
	500		
	1000		
	2000		