

## Digital SLR



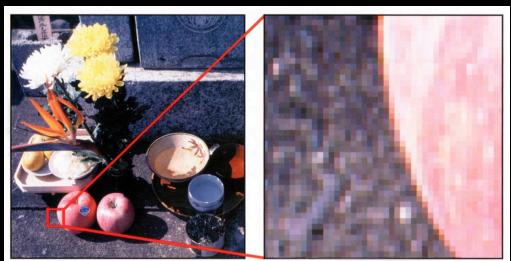
## Film & print scanners



## The Pixel

- Pixels can represent the tonality (greyscale) of a subject
- Pixels, in channels, can represent the colour of a subject
- Pixels, as resolution, can show the detail of a subject

## The digital image



## More pixels, more detail



## Bits & Bytes

- One bit = the numbers 0 or 1
- One byte = 8 bits, eg 00000111
- 1 Kb = 1,000 bytes
- 1 Mb = 1,000,000 bytes
- 1 Gb = 1,000,000,000 bytes
- 1 Tb = 1,000,000,000,000 bytes

Note: numbers rounded down from 1024 to 1000 for simplicity.

## Bit Depth: 1 Bit Image - $2^1$

- Only two tonal choices:  
Black or white



## Bit Depth: 2 Bit Image - $2^2$

- Four tonal choices:  
Black, dark grey,  
light grey or white



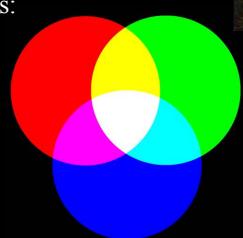
## Bit Depth: 8 Bit Greyscale - $2^8$

- 256 choices of tone  
White > Grey > Black
- Minimum acceptable choice for photography
- More than the human eye can resolve



## RGB Colour Mode

- Additive Colour Synthesis
- Components:
  - Red
  - Green
  - Blue



256 Red



24 Bit Colour Image



256 Green



256 Blue



## Bit Depth: 24 Bit Colour Image

- 8 bits per channel
  - 256 tones per channel
- Three channels
  - Red -  $2^8$  tones
  - Green -  $2^8$  tones
  - Blue -  $2^8$  tones
- $2^{8 \times 3} = 16,777,216$  Colours

## Back to cameras

### Analogue cameras

- Single -Lens Reflex camera
- Viewfinder camera
- Twin-Lens Reflex camera
- View camera
- Miscellaneous types:
  - Panoramic camera
  - Instant cameras
  - Holga, Lomo & Diana cameras
  - Pinhole cameras

### Digital cameras

- Camera phones
- Compact (consumer) cameras
- Single -Lens Reflex camera
- View camera

## Formats

### Film

- Small format
  - 35mm film - size: 24x36mm
- Medium format
  - Roll film - size: 45x60, 60x60, 60x70mm
- Large format
  - Sheet film - size: 5x4, 5x7, 10x8 inches

### Full Frame 24x36mm

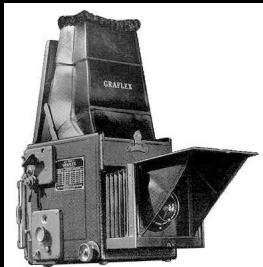
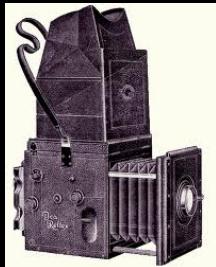
- 3024 x 2016
- 4544 x 3032
- 6048 x 4032

Note: pixel dimensions are indicative.

### Digital

- 4 megapixels = 2464 x 1632
- 8 megapixels = 3264 x 2448
- 12 megapixel = 4290 x 2800

## Early Single-Lens Reflex Cameras



## Single-Lens Reflex Camera



## Single-Lens Reflex Camera



## Single-Lens Reflex Camera

- Characteristics of a modern SLR
  - Through the lens (TTL) viewing
  - Mirror mechanism
  - Pentaprism and/or viewing screen
  - Interchangeable lenses
  - Small or medium format
  - Film or digital

## Single-Lens Reflex Camera

- Advantages
  - TTL viewing and focus
  - TTL metering
  - Wide choice of focal length lenses: wide, standard, telephoto, zoom, macro etc.
  - High shutter speeds
  - Wide choice of third-party lens available

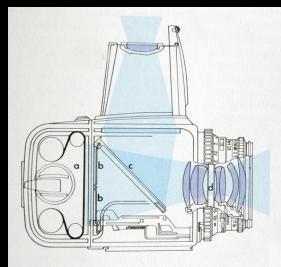


## Single-Lens Reflex Camera

- Disadvantages
  - Complex & fragile mechanism
  - Mirror and shutter noise
  - Mirror “Black Out”
  - Limited flash synchronisation
  - Small format size, film or digital chip



## Single-Lens Reflex Camera medium format



## Single-Lens Reflex Medium Format Camera

- Advantages
  - TTL viewing and focus
  - TTL metering (option)
  - Modular design: lenses, body, film backs
  - High quality optics
  - Compur shutter (and flash synchronisation)
  - Larger film or digital sensor size



## Single-Lens Reflex Medium Format Camera

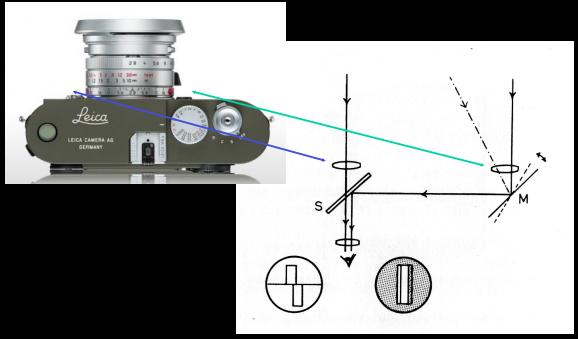


- Disadvantages
  - Complex & fragile mechanism
  - Mirror and shutter noise
  - Mirror “Black Out”
  - High cost
  - Very high cost of digital back

## Viewfinder Camera



## Viewfinder Camera



## Viewfinder Camera

- Characteristics

- Separate optical viewing system
- Coupled Rangefinder system (professional cameras only)
- 35mm or digital
- Also some roll film



## Viewfinder Camera

- Advantages

- Compact and light weight
- Few mechanical parts
- Quiet shutter
- Easy to focus in low light
- High quality optics



## Viewfinder Camera

- Disadvantages

- Parallax at close up ranges
- Limited choice of lenses
- Expensive, but keeps value



*A Leica is for life!*

## Twin-Lens Reflex Camera



Roll Film

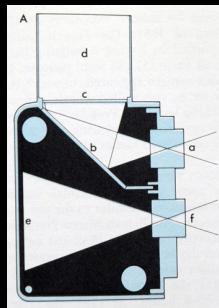
Digital mini



## Twin-Lens Reflex Camera

- Characteristics

- Twin mounted lenses
- Coupled focusing
- Roll film only
- Good for portraiture and general work



## Twin-Lens Reflex Camera

- Advantages
  - Roll film
  - Quiet shutter
  - Reliable, few mechanical parts
  - Large view finder
  - An inexpensive route into medium format



## Twin-Lens Reflex Camera

- Disadvantages
  - Parallax viewing
  - Not suitable for close up work
  - Little or no choice of lenses



## View Camera



## View Camera

- Characteristics
  - Unchanged 19<sup>th</sup> century design
  - Through the lens viewing on a ground glass screen
  - Modular design:  
Lenses, bellows, film backs and sizes
  - Monorail or Baseboard design
  - Architecture, landscape and studio use.

## View Cameras



## View Cameras

- Advantages
  - WYSIWYG
  - Preview focus & depth of field
  - Lens and film plane movements
  - Large film size means high quality images
  - Single sheet exposure and processing
  - Modular design



## View Cameras

- Disadvantages
  - Tripod at all times
  - Bulky and heavy
  - Slow to use:
    - Focus, set aperture and shutter, close lens, load film holder, remove dark slide, expose, replace dark slide, remove film holder, open lens again.
  - Dim viewing, requires focusing cloth
  - Image upside down

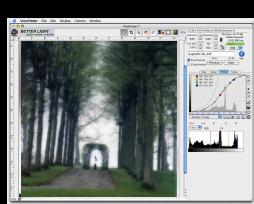


## Digital View Camera?

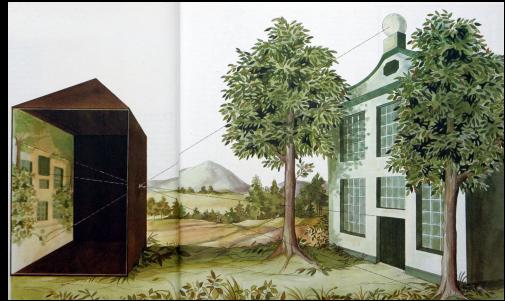
- No problem!
- Same camera plus a digital scanning back
- Requires to be tethered to a computer or laptop when in use



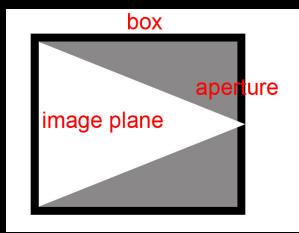
## Software control of the image



## Camera Obscura

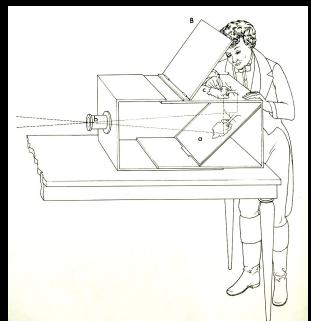


## Camera Obscura



- Components:
  - A light tight box
  - An aperture
  - An image plane

## Camera Obscura - Portable



## The Basic Camera

- Common components to all cameras
  - A light tight box
  - An aperture
  - A light tight cap
  - A film plane

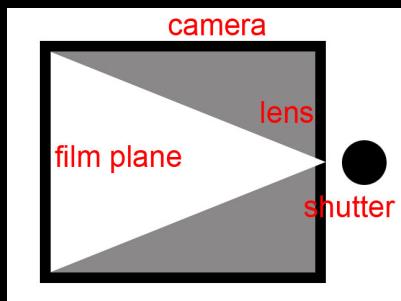
## The Basic Camera

- Common components to all cameras
  - Camera body
  - Aperture (with lens)
  - Shutter
  - A film plane

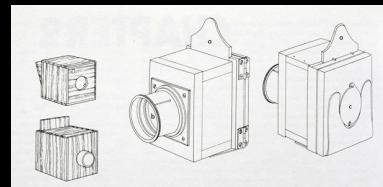


Justin Quinnell  
and his wheelie bin camera

## Basic Camera



## Fox Talbot's Mousetraps



## Miscellaneous camera types

- Panoramic camera
- Instant cameras
- Holga, Lomo & Diana cameras
- Pinhole cameras



## Panoramic Cameras

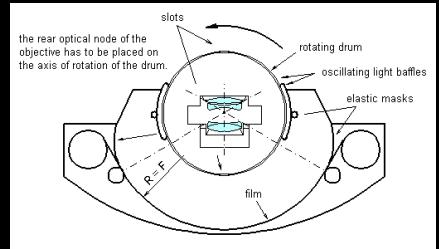


- 180° angle of view
- Rotating lens mount
- 35mm or 120 roll film

## Panoramic View



## Panoramic Cameras



## Panoramic View



## Instant cameras

- Fuji Instax cameras
  - Fuji instant film
- Polaroid
  - Limited film, made by the *Impossible Project*, available for some Polaroid cameras



## Instant films



## Holgas, Lomos & Dianas



- 35mm and roll film cameras
- Plastic lenses with lots of aberrations
- Cult following by users

Holga



Pinhole Cameras



Pinhole Cameras



Pinhole photograph



*Angel of the North*  
6 months exposure



*Louis (getting to know Dad)*  
Justin Quinnell



Largest camera & photograph  
107' x 31'



Handout available @  
[www.fixerstain.com](http://www fixerstain com)

