

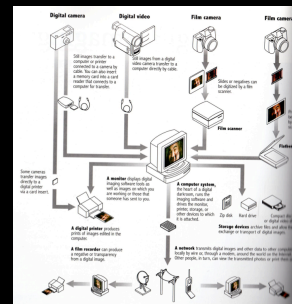
Where are we now?

- Are we all digital now?
- Have we reached the end of analogue technology?
- Are there still technological options for the photographic practitioner?
- Let us consider the contemporary and how we got here.

Digital image capture

- The direct route:
 - Camera phone
 - Compact camera
 - Digital SLR
 - Film scanner
 - Print scanner
 - Video (DVD & HD)
- The indirect route:
 - Film camera
 - Printed image
 - Analogue video

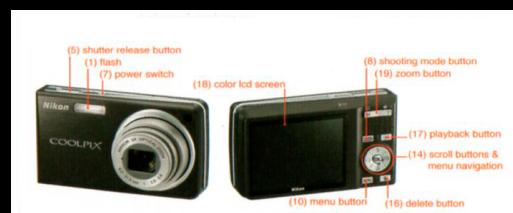
The analogue/digital thing



The familiar



The compact camera



Digital SLR



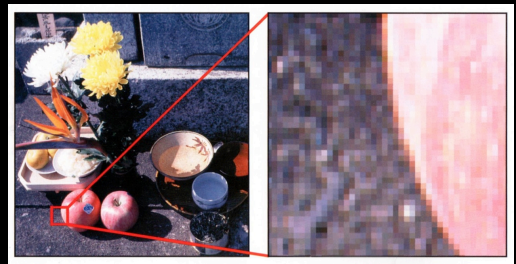
Film & print scanners



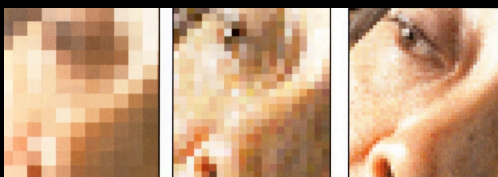
The Pixel

- 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.

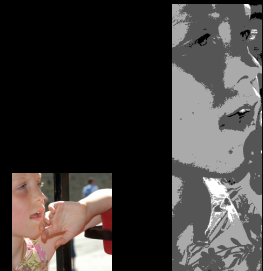
Bit Depth: 1 Bit Image - 2^1

- Only two tonal choices:
Black or white



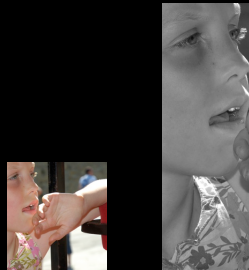
Bit Depth: 2 Bit Image - 2^2

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



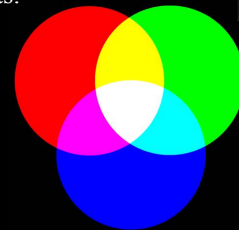
Bit Depth: 8 Bit Greyscale - 2^8

- 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



256 Green



256 Blue



24 Bit Colour Image



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
- $2^{8 \times 8 \times 8} = 16,777,216$ 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

Digital

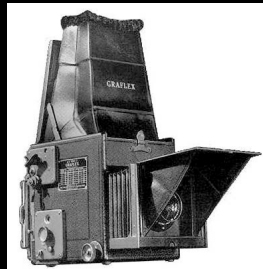
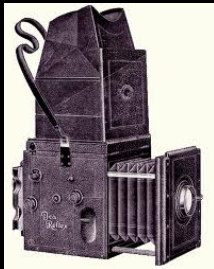
- 4 megapixels = 2464 x 1632
- 8 megapixels = 3264 x 2448
- 12 megapixel = 4290 x 2800

Full Frame 24x36mm

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

Note: pixel dimensions are indicative.

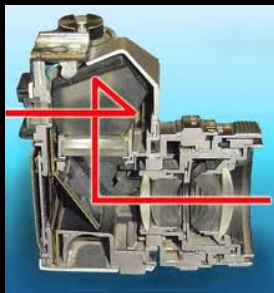
Early Single-Lens Reflex Cameras



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



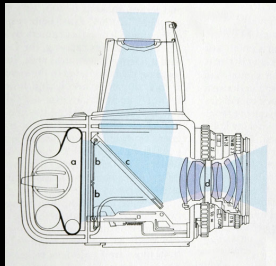
Single-Lens Reflex Camera

- 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



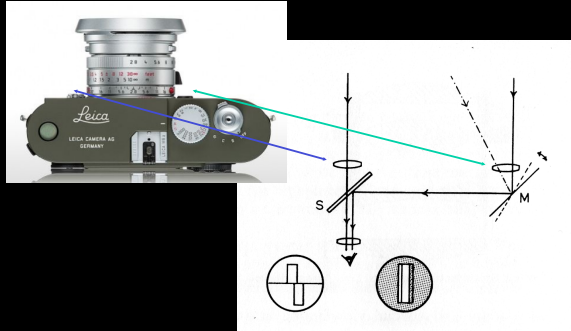
- Disadvantages

- 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

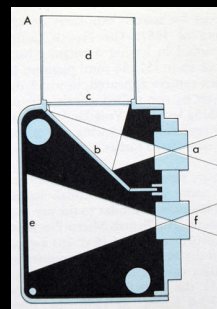


Roll Film

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

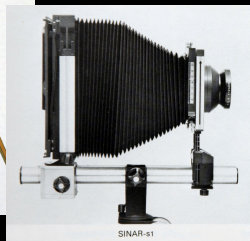


Twin-Lens Reflex Camera

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



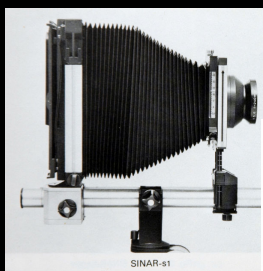
View Camera



View Camera

- Characteristics
 - Unchanged 19th 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



Monorail

Wooden Baseboard



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

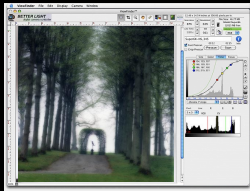


Digital View Camera?

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



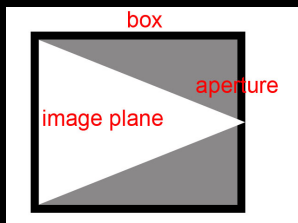
Software control of the image



Camera Obscura

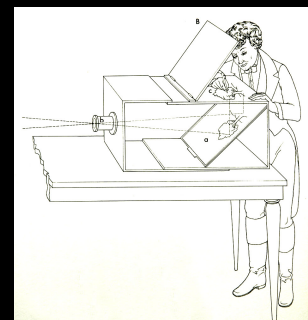


Camera Obscura



- 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

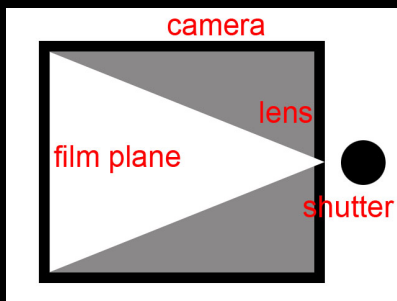
The Basic Camera

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

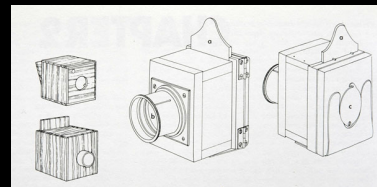
Justin Quinnell
and his wheelie bin camera



Basic Camera



Fox Talbot's Mousetraps



Miscellaneous camera types

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



Panoramic Cameras

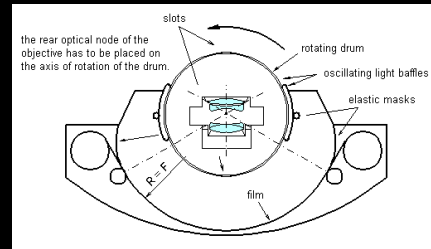


- 180° angle of view
- Rotating lens mount
- 35mm or 120 roll film

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

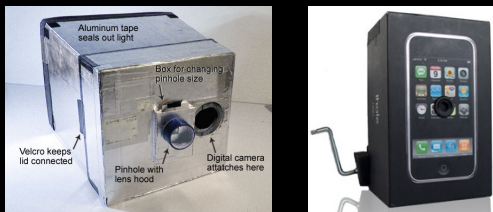
Holga



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

