

# Camera setup to obtain the best image

Bob Breach



# TOPICS COVERED

- File size and type
- Sensors and lenses
- Focussing and depth of field
- Exposure
- Colour settings
- Camera set up options

Plenty of time for questions and practice



File size and type

# FILE SIZE/TYPE

## ■ File size

- For the best image set file size to maximum possible
- Storage is relatively cheap- information cannot be recaptured once taken

## ■ Cards

- Use the best you can afford - not much more expensive than others and more reliable
- Although very large capacity cards are now available, don't be tempted to rely solely on one large card - even good makes can fail
- Only use fast write cards if you really need them (video, other large files and/or fast shooting rate)



## ■ File type

- Ideally use raw and convert later
- Alternatively can often shoot raw with simultaneous jpeg (but uses more card space)

# ALL DIGITAL PICTURES START LIFE AS RAW

- A raw file contains
  - The basic information about the image captured by each pixel
  - EXIF data- camera settings
- Raw files need to be converted to other formats (jpeg, TIFF, PSD, DNG) for most subsequent output and image manipulation
- In many compact/smartphone cameras there is no option to output raw files
  - conversion to jpeg takes place within the camera
  - depending on type there is some ability to adjust raw image conversion
- In SLR and other higher quality cameras the image can be output as raw files allowing much more control over conversion in separate software

# IN- CAMERA JPEG ADJUSTMENT

For those that want to shoot jpegs:

- Many cameras allow you to define the way that the raw image is processed
  - E.g. Colour/saturation/sharpness etc
- Sometimes called “styles” or equivalent
- Effectively you provide instructions to camera for internal processing of all jpegs
- Better cameras allow you to set different styles (i.e. raw processing instructions for different types of image)

# WHY RAW - a digital negative

## ■ Benefits

- Better quality with no image degradation
- Better control over image e.g. shadow and highlight detail
- Easier image enhancements
- Much more flexibility to adjust image settings post capture

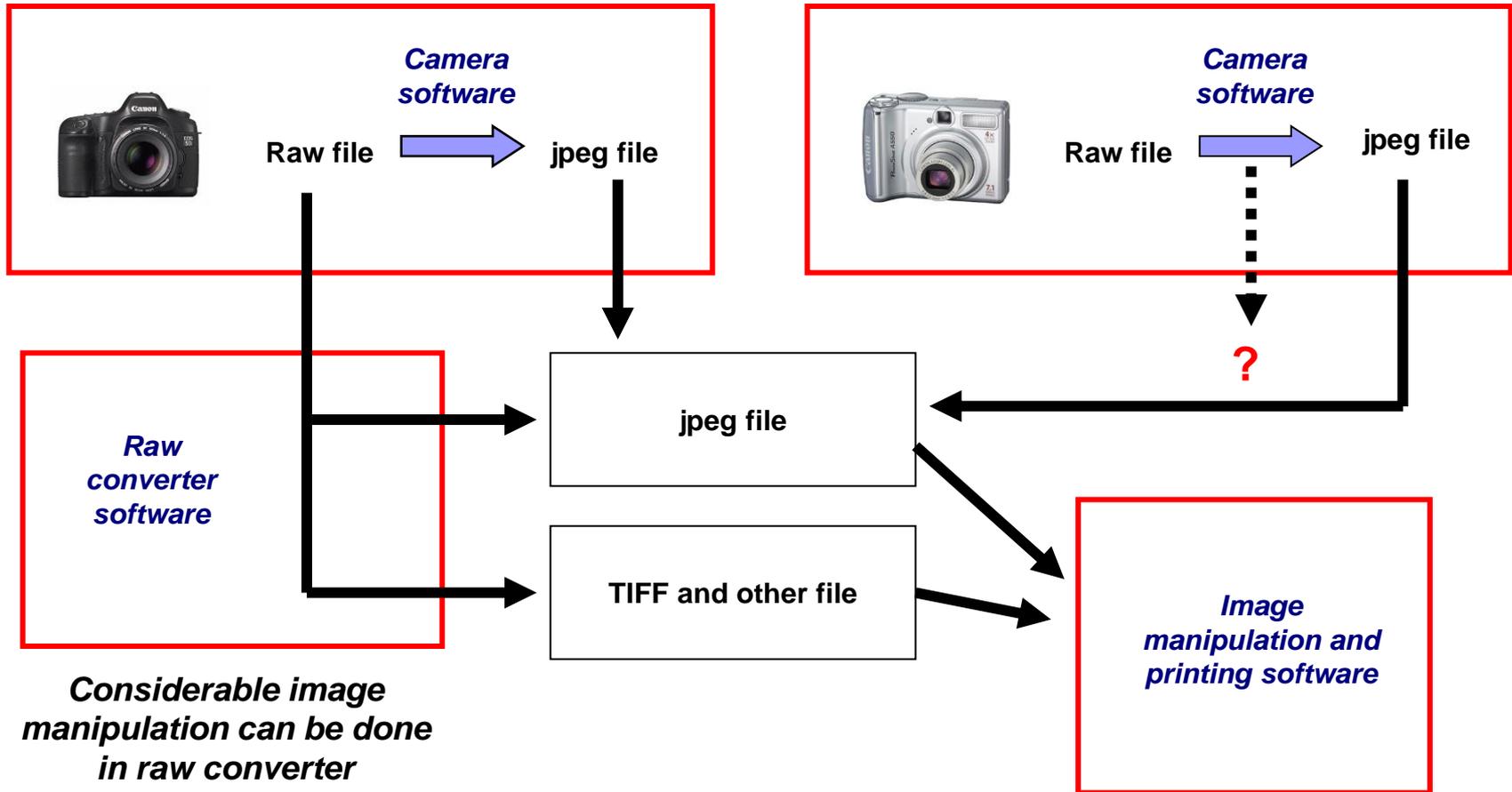
## ■ Disbenefits

- Write time to card
- File size
- Extra processing step

*Most professional digital photographers use raw unless fast processing and transmission needed for press or similar*

# RAW FILES AND CONVERSION

*Camera software can be set up in different “styles” and file sizes*



# WHAT CAN RAW CONVERSION DO?

- Basically can change virtually any aspect related to the pixels and related histogram
- Some higher end programs can also selectively adjust pixels in part of the image
- Includes
  - Colour temperature/tint/colour balance
  - Saturation
  - Contrast
  - Brightness
  - Levels, exposure, curves
  - Cropping and rotation
  - Sharpness and noise reduction
  - Format and size of converted image
- Importantly any adjustment does not impact the original pixels



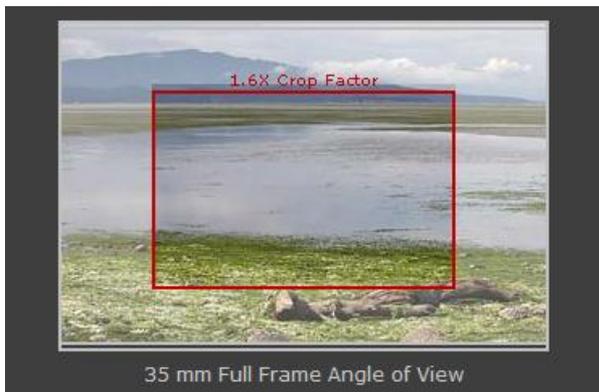
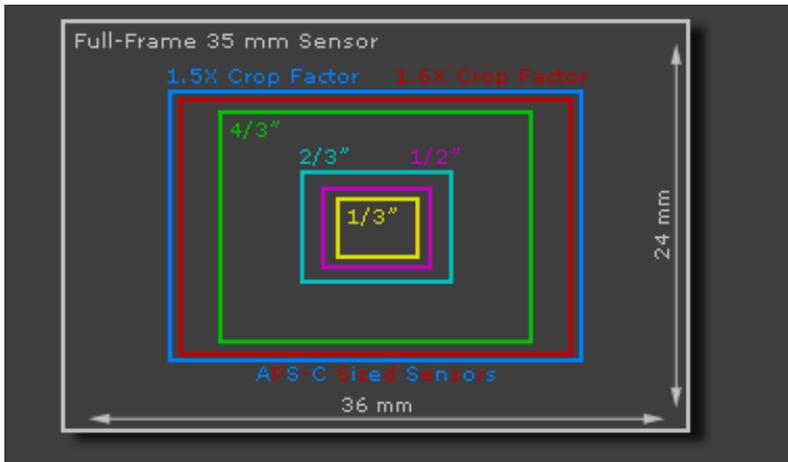
## WHAT RAW CONVERSION CANNOT DO?

- Advanced cloning
- Special filter effects
- Making composite images
- Other complex image adjustment



# Sensors and lenses

# UNDERSTAND THE IMPACT OF SENSOR SIZE



It is pixel quality not pixel count that is important

- Sensors are getting better every year
- Smaller sensors:
  - Tend to be “lower quality” than full frame in terms of dynamic range and resolution
  - Compensated for by fact that use centre of lens which is best part
  - Effectively “multiply” the effective focal length of lenses
  - DOF much greater
- Full frame more expensive but:
  - Better quality **if** use good lenses
  - Higher dynamic range
  - Better selective DOF
  - More possibility for cropping

# MANY OF THE BEST PHOTOGRAPHERS USED ONLY ONE LENS

Henri Cartier- Bresson used a Leica with 50mm lens

“Above all, I craved to seize the whole essence, in the confines of one single photograph, of some situation that was in the process of unrolling itself before my eyes”



“During the work, you have to be sure that you haven't left any holes, that you've captured everything, because afterwards it will be too late”

But with the advent of modern cameras a variety of lenses can be used to develop creative images

# DIFFERENT USE OF LENSES

- Telephoto ( $>150\text{mm}^*$ )
  - Good for wildlife and sports
  - Can compress perspective so can also use to isolate images within landscape
  - But need tripod unless high speed/image stabiliser
  - Relatively shallow depth of field
- Mid range ( $35\text{-}150\text{mm}^*$ )
  - Good for general work and portraits
  - Ideal portrait lens  $80\text{-}90\text{mm}$
- Wide angle ( $<35\text{mm}^*$ )
  - Landscapes (but need foreground interest)
  - Can also use for environmental portraits

\* Based on full frame - convert for other sensor size

# MACRO LENSES

- Macro (close up) work a topic in its own right
- Macro lenses allow much closer focussing than normal lenses
- Designated by multiplication factor
  - 1x means actual object is same size on sensor
- But closer you go the shorter the depth of field
- Can achieve macro with other approaches e.g extension tubes

# PRIME V ZOOM LENSES

- Prime (Fixed focal length)
  - Smaller, faster (wider aperture)
  - Sharper relative to cost
  - Need more lenses to cover different focal lengths
  - Need to move position to obtain best composition
- Zoom
  - Usually larger in size but reduces need for lots of separate lenses
  - Usually slower (but image stabiliser helps)
  - Lower depth of field
  - Image quality tends to be poorer relative to cost

# FILTERS

- Digital cameras mean less need for colour correction filters
- Normally have simple UV filter to protect lens
- Other filters which can be useful for digital cameras in some situations
  - Polarizer - improves saturation and reduces reflections
  - Graduated filters to balance light skies with darker foreground
  - ND filter to reduce speed and give “milky” water/cloud effects

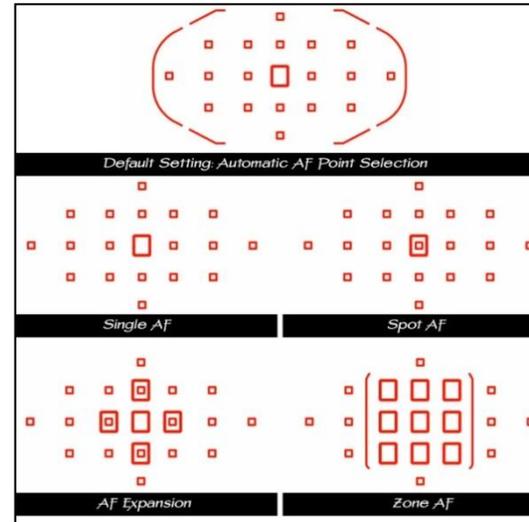
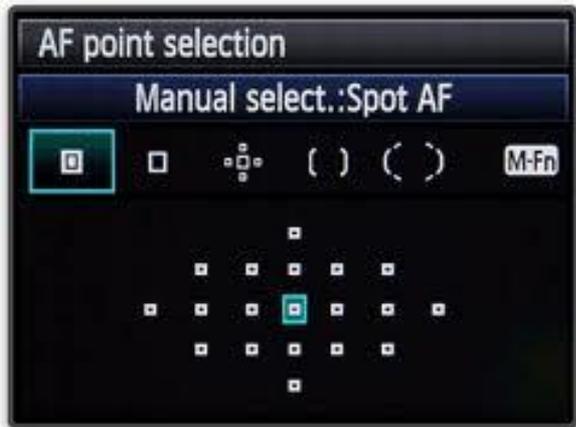


# Focussing and depth of field

# AUTOFOCUS

- Standard autofocus is usually very accurate on most modern cameras
- More sophisticated cameras provide other focus options dependant on the make and model
  - Zonal focus to allow specific focus on part of image
  - Spot focus for very accurate focusing on single object
  - Tracking focus for moving objects
- For accurate work may need manual focus
  - Macro where depth of field very small
  - Accurate landscape images using hyperfocussing

# SETTING FOCUS POINTS



- Modern cameras allow flexible focus points/zones
- Understand how yours work
- Set focus points according to subject
- Or lock central focus and recompose

# DEPTH OF FIELD (DOF)

- Depth of field is the distance within the image which is in focus
- Mainly affected by aperture(F number) – smaller F stop shallower DOF
- Allows creativity in your image
- The “bokeh” is the visual quality of the out-of-focus areas of the image and depends on lens quality

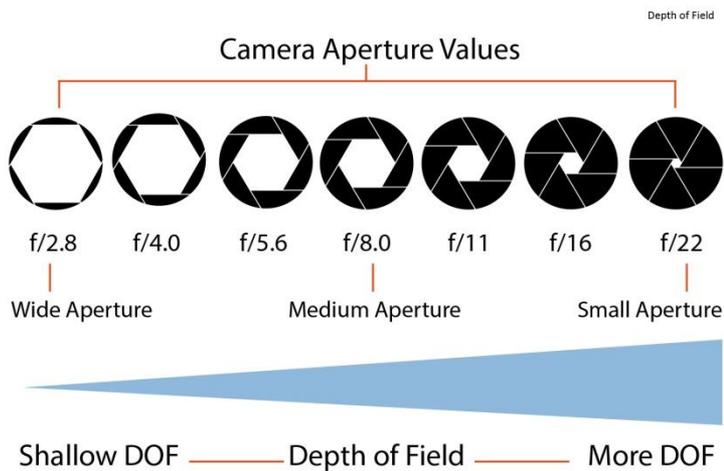
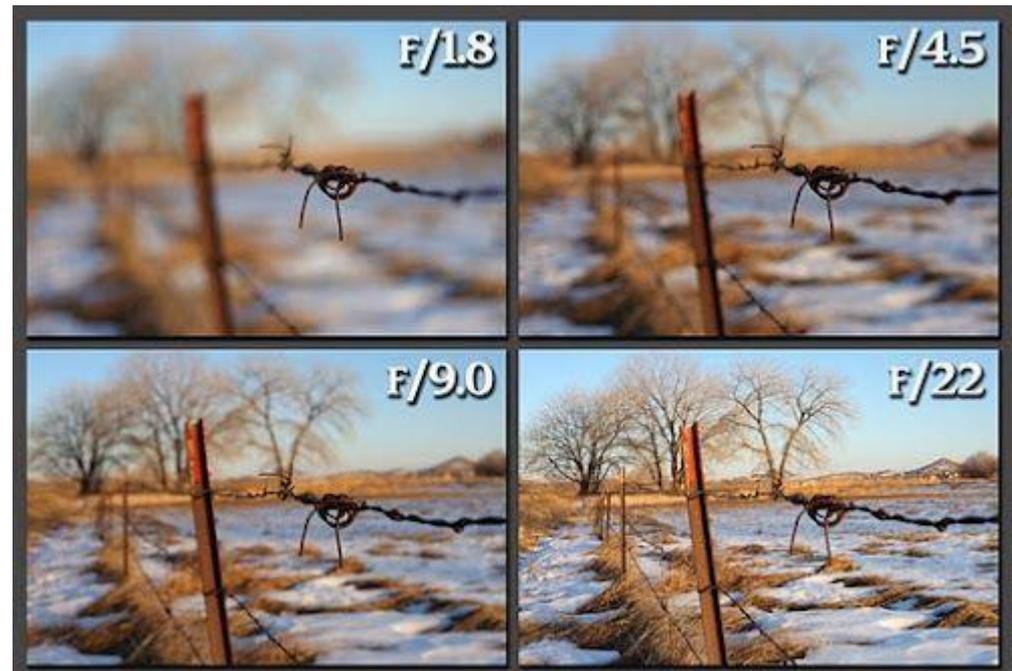


Fig. 0

Illustration © Tarek ElBaradie  
www.baradiephotography.com



# LENS AND DEPTH OF FIELD (DOF)

- DOF Varies with:
  - Lens
  - Aperture
  - Image distance
- Small DOF obtained when:
  - Close to subject
  - Large aperture (e.g. F2.8)
  - Long focal length (e.g. >300mm)
- Large DOF obtained when:
  - Far away from subject
  - Small aperture (e.g. F16)
  - Short focal length (e.g. 24mm)
- Can use DOF creatively



In low light large DOF can require long exposures (shake)

# ASSESSING DEPTH OF FIELD

- Older lens often had DOF scale but not usually available on modern zoom lens



- Alternatively:
  - DOF calculator/app
  - DOF preview (but often dark)
  - Use hyperfocal point

# HYPERFOCAL POINT



Hyperfocal point

- Hyperfocal point is “the focal point within the picture where everything from half that distance to infinity is in focus”
- Approx 2x more DOF behind hyperfocal point than in front
- Focussing at infinity “wastes” DOF
- Focussing at the hyperfocal point maximises DOF

# CREATIVE USE OF DOF

- Learn how use of DOF can help your image
- Shallow DOF to focus on main subject - can be off centre to improve composition
- Make sure that focus point is on main part of image e.g. eyes for portrait
- Large DOF usually needed for landscapes etc, but make sure there is foreground interest

# CREATIVE USE OF DOF

## differential focussing





Exposure

# EXPOSURE

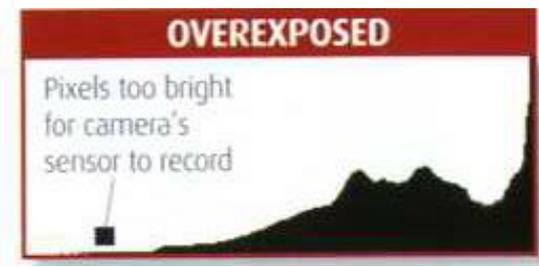
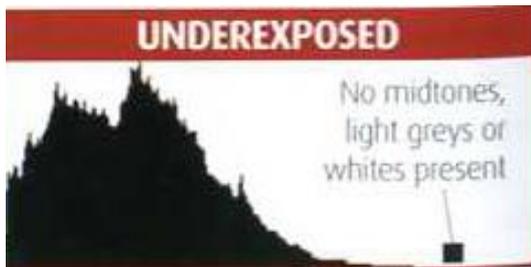
- Need to balance three different settings to control exposure
  - ISO setting
  - Aperture
  - Speed
- “Auto” does this for you but you lose control
- Use Aperture, Speed or ISO settings to improve control depending on subject and available light
- Some cameras have auto ISO where for example you can fix aperture and ISO will adjust within defined limits
- Can autobracket exposure manually and some cameras have “autobracketing” (but uses up card space faster)

# EXPOSURE METERING

- Exposure metering is usually very accurate on modern cameras
- Better cameras often give exposure options
  - Average
  - Evaluative- best default option
  - Spot- good if main subject very different exposure compared to rest of image
- But metering can be fooled in difficult conditions
- If in doubt consider using bracketing or spot metering on image main subject

# CHECKING THE HISTOGRAM

- The histogram is your friend
- Shows distribution of light and dark pixels
- Learn to read in the field
- Check histogram to avoid loss of detail at both ends
- If a problem consider exposure bracketing



# EXPOSURE CORRECTION

- If take in raw there is considerable flexibility to manage exposure post capture
- Can easily correct in post processing by up to  $\pm 2$  stops
- But even good raw converters cannot recover a poorly exposed image
- Think about the exposure that is right for the image and get as right in camera as possible

# POST CAPTURE RAW LEVELS ADJUSTMENT

Using the Levels Tool



The left image is straight out of the camera and shows both lens flare and some degree of underexposure. The right image is after correction in the Levels Tool.

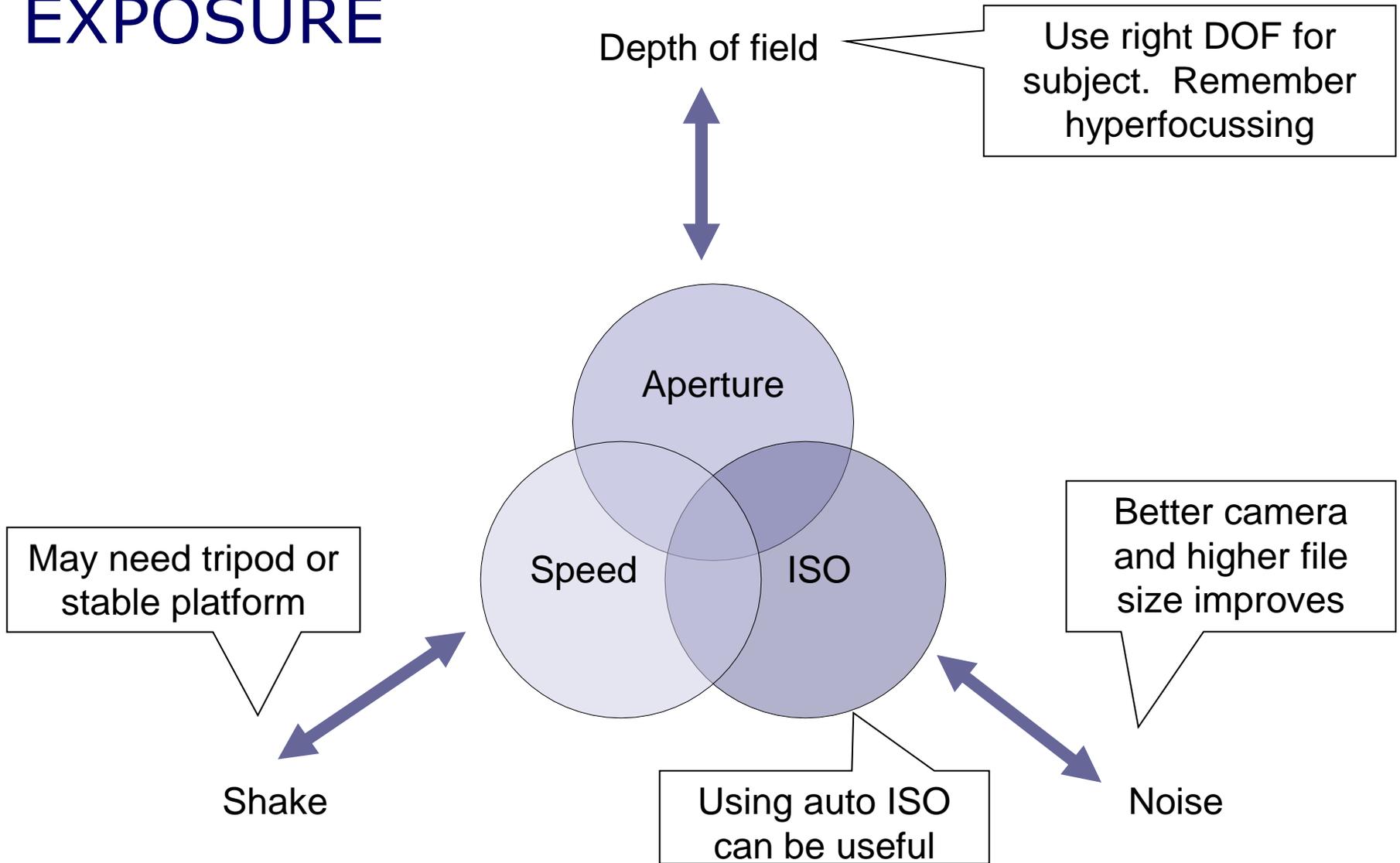
**Before**

**After**

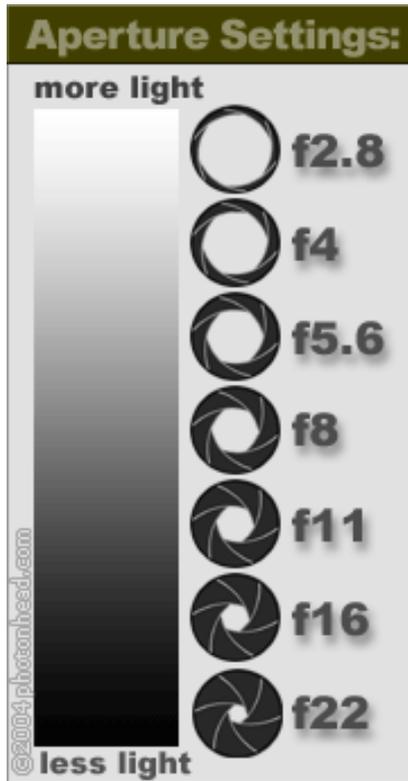
# DEALING WITH TRICKY EXPOSURES

- Not all scenes are average in terms of exposure
- Exposure meters do a good job but can be fooled
- For example:
  - Snow scenes, white wedding dresses are usually underexposed
  - Sunsets, dark moody interiors are usually overexposed
- In such situations check the image and if necessary use exposure compensation control

# EXPOSURE



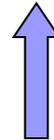
# APERTURE



← Less DOF

More DOF →

f/1.0 f/1.4 f/2.0 f/2.8 f/4 f/5.6 f/8 f/11 f/16 f/22 f/32 f/45 f/64



Lower limit for most  
zoom lenses

- Aperture controls light entering camera
- But also controls depth of field

# SPEED-MINIMISING CAMERA SHAKE

- Slower the speed more likely to have camera shake
  - Rule of thumb: Speed > focal length\*
  - E.g. 200mm: Speed > 1/200 sec
- Ways to minimise problem
  - Use tripod or other stable surface
  - Use image stabilised lens
  - Increase the ISO
- Care: at lowish speeds mirror movement causes vibration
  - Avoid speeds around 1/15 to 1/4
  - Use mirror lock up
  - Use remote release
- High speed can also freeze movement- birds/insects/people

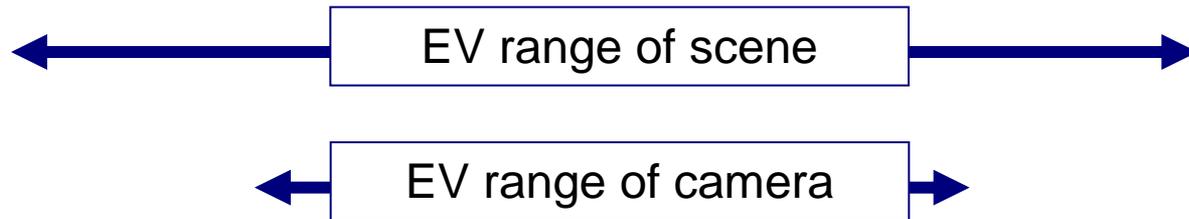


\*Remember to allow for sensor correction factor

# DEALING WITH NOISE

- Digital camera noise is equivalent to grain in film
- Increased ISO setting in digital cameras effectively amplifies the signal from the light sensor
- Depending on the camera as ISO increases can get more “noise” particularly in darker areas of picture
- Larger sensors tend to be less noisy
- Better and newer cameras use clever electronics to minimise noise
- Noise can be further reduced post capture
- As with film grain - noise can be used creatively to add mood to images

# MANAGING HIGH CONTRAST PICTURE



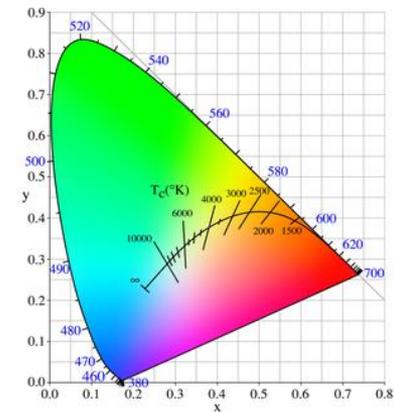
- All cameras including digital have finite exposure range
- In high contrast situations can either blow highlights or lose shadow detail
- Options
  - Compose picture to minimise EV range (e.g. avoid bright sky)
  - Bracket exposure and correct later (e.g. HDR)
  - Use fill in flash
  - Use graduated filters



# Colour settings

# COLOUR SPACE

- Colour space is a complex issue, but essentially defines the range of colours that can be recorded or printed in an image
- For amateur use there are two main types
  - Adobe RGB (1998) – has a larger range of colour and is used for colour printing as it matches the colour range available from inkjet printers
  - sRGB – has a smaller range of colours and is used for images destined for web, e-mail and projection as it matches the more restricted colour gamut of monitors and projectors
- The colour space can be set in camera.
- Recommended to set camera to adobe RGB to capture maximum range of colours but can change later to s-RGB if required ( e.g. for web or DPI output)



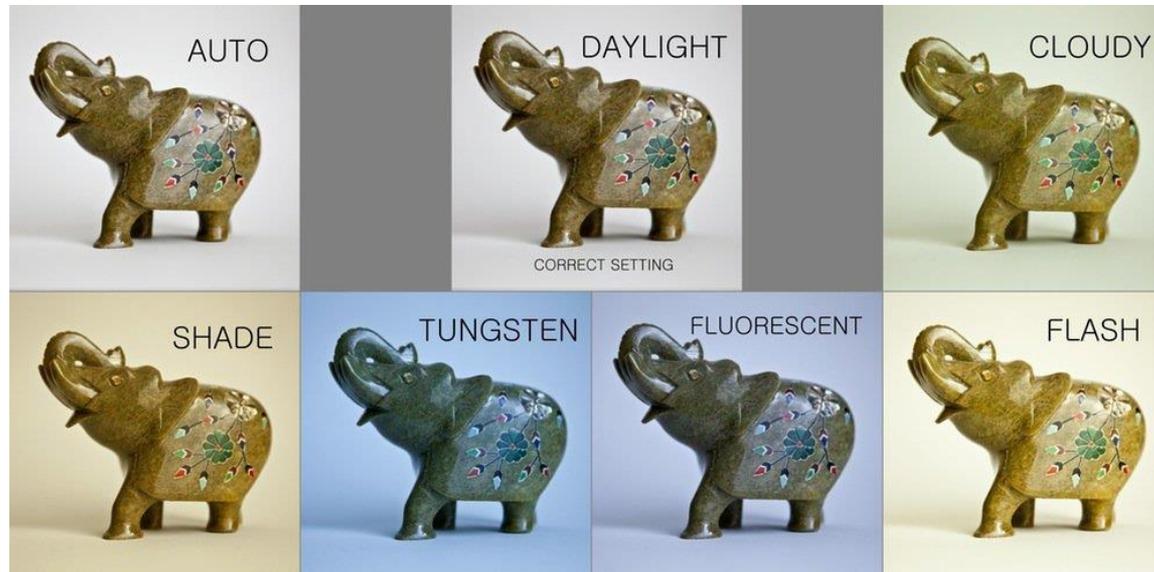
# COLOUR TEMPERATURE

## White balance

- The time of day (with natural light) or type of artificial lighting (indoors) can impact on the overall warmth or tone of an image
- On a digital camera you can:
  - Set an appropriate colour (white) balance appropriate to the conditions (shade/daylight etc.)
  - Leave camera on fixed (e.g. 5200 K setting)
  - Leave camera on auto white balance
- Auto white balance usually easiest unless for example you want to take dramatic sunsets or very accurate colour
- Where necessary in post processing you can:
  - Use the temperature slider to adjust colour temperature
  - Or use white balance colour picker to get neutral tones



# ACCURATE WHITE BALANCE



- For really accurate colour (white) balance e.g. for product shots or at weddings you may need to use a “grey card”
- This is a neutral coloured card which you include in a trial shot
- In post processing you can then bulk edit the white balance for all other images taken under the same conditions



# Camera set up

# CAMERA SET UP OPTIONS

- Most cameras have various modes
  - Use right mode for different types of image
- Auto
  - Does everything for you! Mainly for happy snappers
- Program mode
  - Balances speed and aperture according to light
- AE mode
  - Allows you to fix aperture with speed being set by camera exposure - good for DOF control but watch camera shake
- TV mode
  - Allows you to fix speed with aperture being set by camera exposure- good for movement or long focal length lens
- Custom function- some cameras allow you to set up different custom functions for particular regular use

# THINGS TO TRY

1. Check your manual – boring but essential
2. Check your file type set up
3. Investigate impact of different focal length lenses and sensor type
4. Experiment with creative use of DOF
5. Check the exposure control options on your camera
6. Experiment with different exposures and read histogram
7. Check noise settings on your camera- know how far you can push your sensor

***Practice, practice, practice so that you can adjust camera settings during a shoot without even thinking or checking the manual***