Introduction to Exposure

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Sections

- Exposure Controls and Cameras
- Shutter Speed
  - Effect of Changing Speed
- Aperture
  - Effect of Changing Aperture
- Changing ISO
- Exposure Control/Compensation
- Histogram and Highlight alert
- Colour Temperature/Metering Settings

Exposure Controls and Cameras

- Types of Camera
  - Compact
  - Bridge
  - SLR
- They all use the same controls
  - Speed, how long the shutter is open
  - Aperture, how wide the shutter opens
  - ISO, how sensitive the sensor is
- More expensive cameras give more control

Exposure

- Exposure is the amount of light allowed to fall on the sensor, when we open a shutter on a camera.

- Overexposure
  - This is when we allow too much light in
  - The picture is too bright

- Underexposure
  - This is when we allow too little light in
  - The picture is too dark

Exposure

- Underexposure

Exposure

- Overexposure

Exposure Controls

We will use an analogy to explain the controls of the camera

- Imagine we are filling a glass of water
- A full glass represents the proper exposure
  - I can fill the glass quickly (big pour)
  - I can fill the glass slowly (little pour)
- In both cases the glass gets filled

Exposure Controls

- Obviously, the wider the hole (aperture), the faster the glass will fill
- Exposure works in exactly the same way
  - The larger the aperture, the faster the shutter speed

Aperture Measurement

- Aperture is measured in what are called stops
- As the numbers get bigger, the aperture gets smaller
  - Is this confusing?
- Consider ½ Orange ¼ Orange 1/8 Orange 1/16 Orange
- As the number gets bigger, the piece of orange gets smaller
  - So these are just fractions (a measure of how much it opens)
- Lets look at some apertures...
- Look at lens in Class

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Aperture

f2.8

f4

f5.6

f8

f11

f16

Aperture Measurement

- The F-stops available will be different for each lens
- The more expensive lenses will tend to open wider

- The main stops are:
- F1.4, F2.8, F4, F5.6, F8, F11, F16, F22, F32
  - But your lenses may not have all these

- Going from F1.4 to F2.8 closes the lens down by one stop
  - (i.e. the aperture will be smaller)
  - This halves the amount of light allowed enter the lens

Speed Measurement

- Shutter Speed is measured in seconds
- Setting your camera to 60, opens the shutter for 1/60 sec
- Setting it to 4 sets ¼ sec
- Setting to 0” 5 sets the shutter to 0.5 sec
- Speed settings:
- 1/1000, 1/500, 1/250, 1/125, 1/60, 1/30, 1/15, 1 sec

Combining Speed and Aperture

- Remember our example of filling the glass of water
- If the tap is twice as big, the glass will fill twice as quick
- So its not too much of a stretch to imagine that depending on how much I open the tap, it will fill in a different time
- Each setting here gives the same exposure
  - I.E. Each still fills the cup
- Try it
  - Set the Dial to “P”
  - Press half way for exposure
  - Turn the dial and the camera will show you these equivalent exposures

Combining Speed and Aperture

- Each F-stop doubles the amount of light
- So if we double the light and half the shutter speed,
  the amount of light will remain the same

1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1
F1.4	F2.8	F4	F5.6	F8	F11	F16	F22

- Each setting here gives the same exposure
  - I.E. Each setting will still fill our cup of water

Camera Settings

The good news is:

- You don't have to remember these settings,
  - the camera does that for you

- Lets Try it
  - Set the Dial to "P"
  - Press the shutter button half way for exposure
  - Turn the wheel dial and the camera will show you these equivalent exposures
- Note
  - Your camera will set speed/aperture in ½ steps or even 1/3 steps
  - Setting your camera to P is the same as Auto, without the flash

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Camera Settings

We've seen that setting the camera to "P" or Program mode, the camera will choose a setting for us, that we can change by spinning the dial. This is not very convenient.

Usually we use the camera in "Semi-Automatic" mode. We set one setting and the camera sets the other, e.g.

- Set the camera to Av to set our aperture, the camera will set the speed

or

- Set the camera to "Tv" or "S" to set our speed, the camera will set the aperture

- Let's try...

Camera Settings

Now that we've seen how easy it is to set the controls, lets look at the effect of using different settings for

- Aperture
- Speed

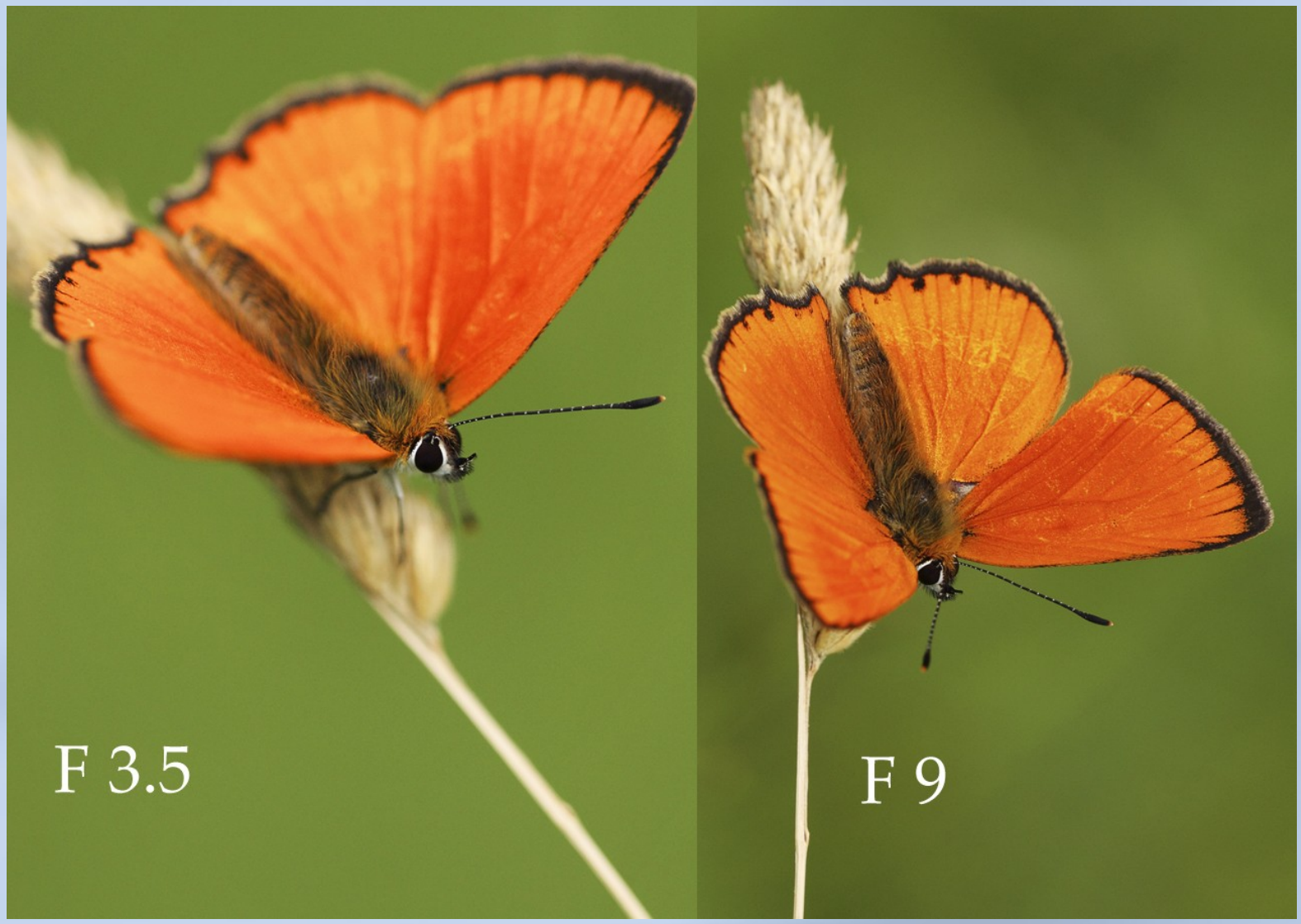
Changing Aperture

Adjusting the aperture changes how much is sharp in our image, this is called depth of field.

- A Small Aperture, gives a wide depth of field (e.g. F11)
  - This means “everything” is in focus
- A Large Aperture, gives a narrow depth of field
  - This means only the “focus point” is in focus
- Lets look at some examples...

Effect of Aperture

Effect of Aperture



Changing Shutter Speed

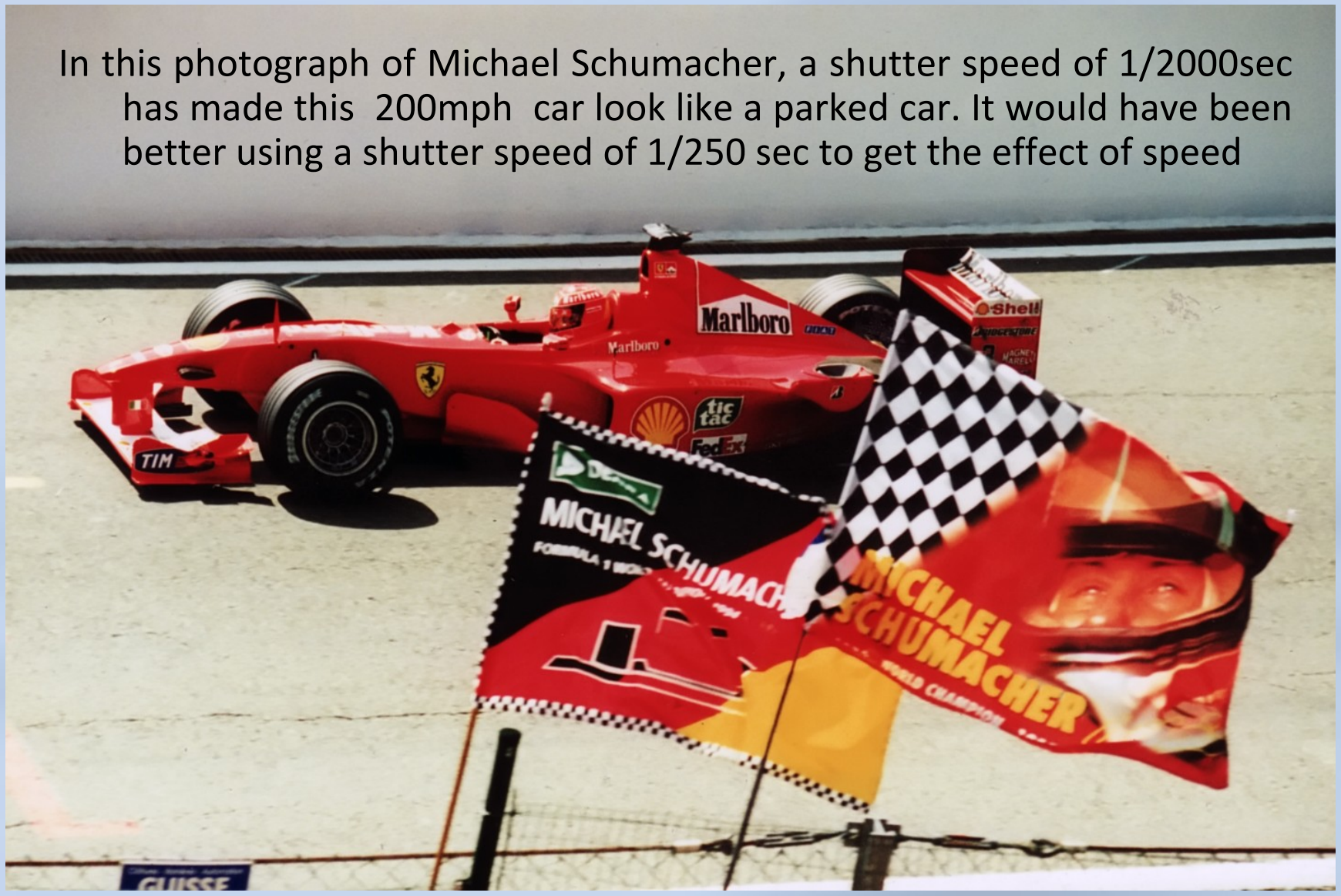
Adjusting the shutter speed has many more functions than just freezing movement; consider the following

- A fast Shutter speed can be used to freeze fast moving objects, however it should be considered whether freezing all the motion loses the effect of the action
- A Slow shutter speed may be used to add some blur to the image to highlight the movement
- Most picture blur occurs because the shutter speed is not fast enough (law of the lever!)
- The Shutter speed should be roughly equal to the focal length of the lens (e.g. For a 300mm lens, use 1/250 sec)
- Use a tripod for any shutter speeds less than 1/60 sec (use it when you can anyway!)
- Another way to slow the shutter speed is to reduce the aperture

Effect of Speed

Effect of Speed

In this photograph of Michael Schumacher, a shutter speed of 1/2000sec has made this 200mph car look like a parked car. It would have been better using a shutter speed of 1/250 sec to get the effect of speed



Changing Speed

Moving the camera to follow the subject is called “Panning” the camera.
In this case panning was necessary because the hares were running away

Effect of Speed

In this case panning was used to create a blurred effect on the background

ISO (Sensitivity)

- The ISO sets the sensitivity of the camera sensor to light
- It is usually adjusted in steps from 100, 200, 400, 800, 1600 (much higher in newer cameras)
- Lets Look at an example:
- My camera is on ISO 100,
- I set my camera to Av F2.8
- The camera sets the speed to 1/1000 sec
- Now increase the ISO from 100 to 200, my shutter speed will reduce to 1/500

ISO (Sensitivity)

- Notice that for each doubling in ISO, the shutter speed halves
- The units of ISO are stops, the same as aperture and speed
- In our glass of water analogy, changing the ISO from ISO 100 to 200 is the same as just filling the glass half full
- Note: that there is a cost to increasing the ISO...As the ISO gets higher, the amount of “noise” in the picture increases (We’ll look at an example rather than define it).

- Look at the dark areas.
- The red pixels are called noise and the effect of high ISO

Setting an Exposure

Setting an Exposure involves setting

- The Aperture
- The Speed
- The ISO

For a given lighting, we normally fix the ISO
(For Now lets say ISO 200)

Choose either Aperture Mode (Av) or Speed Mode (S or Tv)

Set either the speed or aperture

The camera will automatically set the other setting

Setting an Exposure

- The lighting situations may dictate what aperture to select, e.g. low light situations may mean that you need all the light you can get, so maximum aperture is used
- Fast action may be required to freeze the action, in which case the maximum aperture might be used
- The subject may dictate the aperture, so a landscape shot requiring maximum depth of field means I will select f11 or higher
- Learning how to set these settings is like learning to drive, after a while you don't think about it, (and like driving, some never learn!)
- That's it (for now!)

Thank you for listening