CHAPTER 5 CAMERA BASIC TECHNIQUES

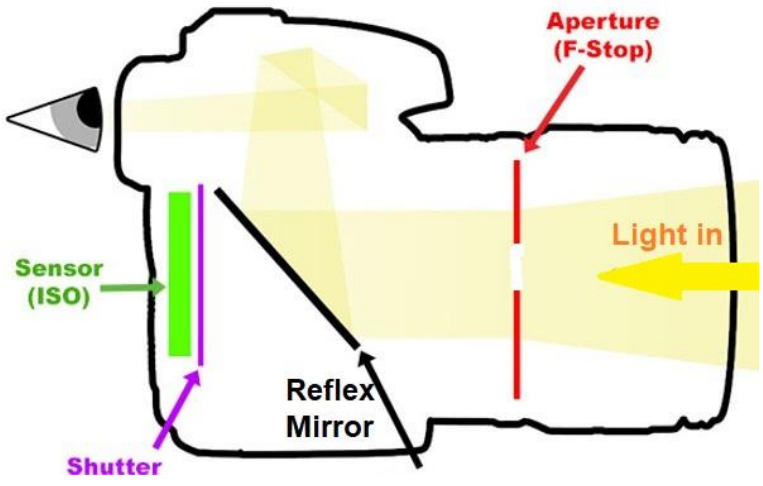
This Chapter is to give a basic understanding of photography and covers:

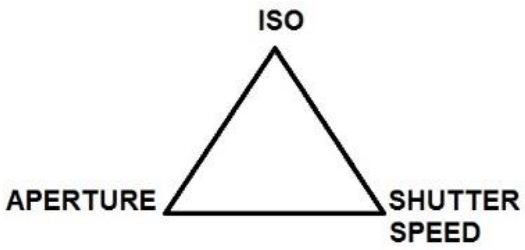
- Exposure
    - Exposure Triangle
    - Camera modes
- Controlling
    - Depth of Field
    - Image Quality
- Handling difficult conditions
    - Low Light without lighting
    - Exposure metering
    - Exposure compensation
- Does and don’ts

Chapter 9 goes into more advanced photography for those who are interested.

Exposure

- Cameras work by capturing light
- Light needs to be controlled
- To control light it needs to be measured
- The measurement is expressed as a combination of **Shutter speed** and **Aperture** for a given **ISO** and is called an exposure



• Exposure Triangle  	• All are interrelated and together make up the basis of a 'correct' exposure • All cameras have a 'shutter' and an 'aperture diaphragm' to control the amount of light getting to the sensor

Choice 1 - ISO

- Controls the sensitivity of the **sensor** to light
- Expressed as an ISO number
    - 100, 200, 400 and so on
    - Relates back to the days of film when film had a speed rating expressed as ISO
- Each of these intervals is called a '**stop**'
- Each stop halves or doubles the **sensitivity** of the **sensor**.

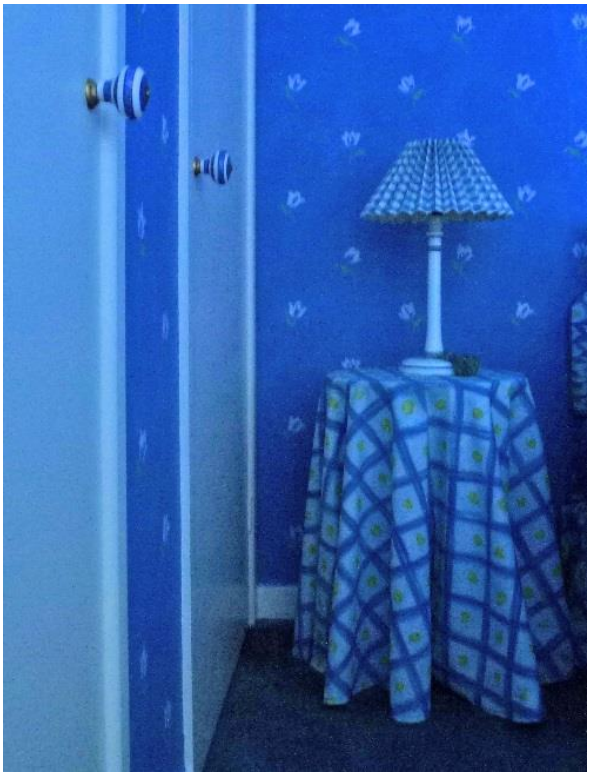
The ISO side effect…

Noise

- The higher the ISO you use the less light you will need for the shot but the more **noise** you will introduce to the image. The camera is straining

electronically to record a good picture from too little light. The image is spotted and indistinct:

Taken at ISO 1600



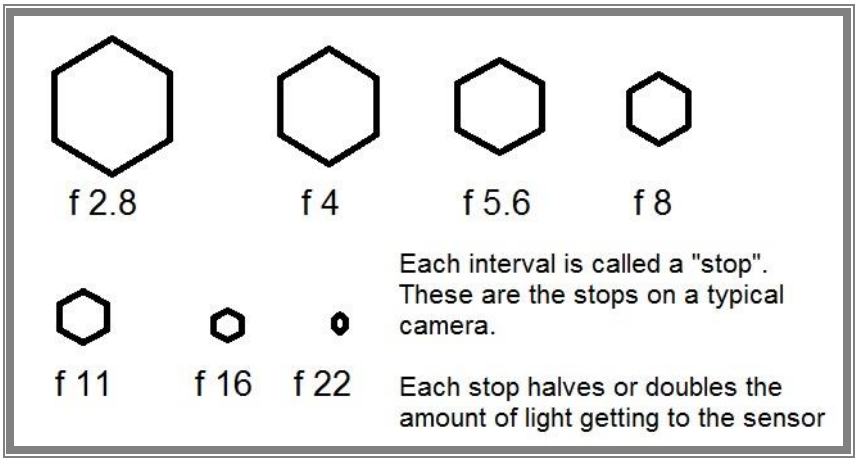
Taken at 100 ISO

- Noise in Church Recording is bad
- In Church Recording we always want the highest quality and therefore the lowest ISO setting.

ISO 100 is recommended for most shots.

Choice 2 - Aperture

- Controls the quantity of light getting to the sensor. The wider it is, the more the light received.
- The Aperture is expressed in ‘f’ **stops** which relate to the size of the hole in the lens
    - f2.8, f4, f5.6 etc.



The Aperture side effect…

Depth of Field

Taken at f22, greater depth of field

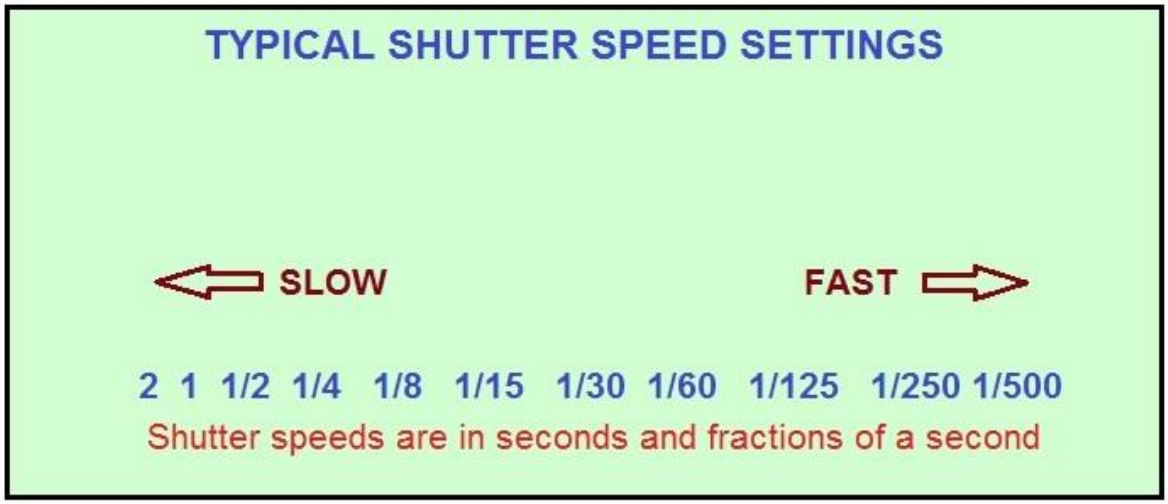
Taken at f4, less depth of field

- More or less of the scene can be made to be in focus depending on the aperture chosen
- For individual subjects, low f number is better;
- For larger subjects (e.g sets of benches), increase the f number;
- For depth pictures (e.g. Church West – East), use a high f number.

A is the most creative aspect of photography and essential for Church Recorders

Choice 3 - Shutter speed

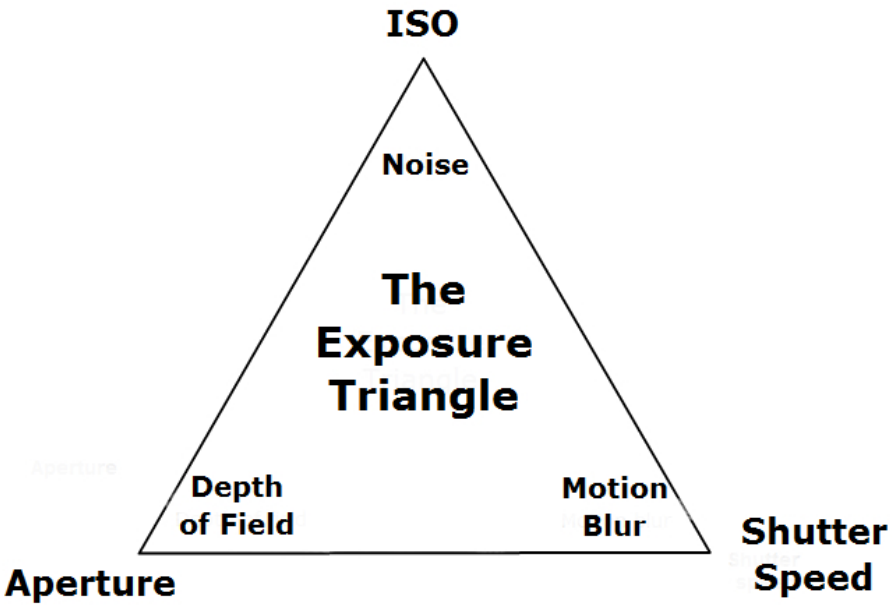
- The shutter controls the quantity of light getting to the sensor. The longer it is open, the more the light received.
- The shutter speed is expressed in seconds or fractions of a second e.g.
    - 1 second exposure expressed as 1” or 1s, 30 second exposure as 30” or 30s and so on
    - One thirtieth of a second exposure expressed as just 30, one sixtieth as just 60 and so on
- Usually, exposures will tend to be less than 1 second but churches can be different!



Each interval is called a ‘**stop**’
Each stop halves or doubles the amount of light getting to the sensor.
Some cameras allow for interim stops.

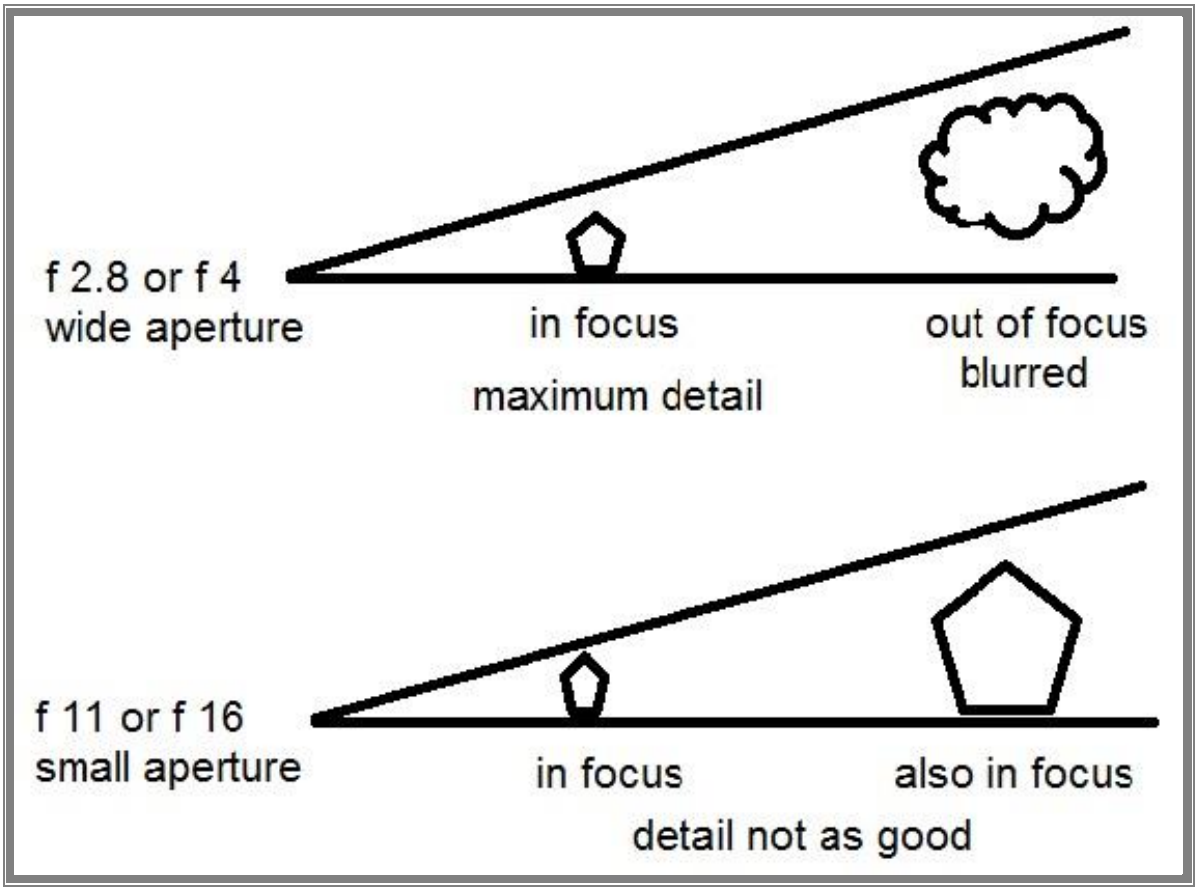
Fast shutter speeds are used for “freezing” fast moving objects. In Church Recording we photograph static objects. We use slow shutter speeds (several seconds in some cases) because the Aperture and ISO settings are much more important for a crisp, true picture

EXPOSURE TRIANGLE with the main issues:



Aperture, Shutter speed and ISO are the exposure triangle for every photograph.

The relationship of the 3 angles of the triangle is that a shutter speed stop, an aperture f. stop and an ISO stop are equal adjustments.
For example: 1/60 @ f 8 @ ISO 100 coincides with 1/30 @ f 11 @ ISO 100. Speed reduced by one stop. Aperture increased by one stop.
But, if, for Church Recording photographs, ISO 100 is a fixed setting, there are only 2 variables, speed and aperture. Taking a static subject with a camera fixed on a tripod, shutter speed is not a worry for us. It could be a second or more, if necessary. **The essential is the best aperture setting.**



- For an individual subject, f 2.8 or f 4 will capture maximum detail in poor light. The background might be blurred. The viewer concentrates upon the subject:

This mythological animal was taken at ISO 100, f5.6 and ½ second shutter speed for a clear picture of the subject with a blurred background

- But, for rows of pews, East/West and West/East views, complete ceiling pictures and other subjects requiring the whole field to be in focus, a small aperture setting, f 11, f 16 or even f 22, is required

For this roof at ISO 100 with 4 seconds shutter speed, f7.1 was sufficient

- A camera set on Aperture priority (A) will meter and set the shutter speed. Sometimes it is several seconds as with this roof;
- It is amazing what a good digital camera will pick up in poor light when set on Aperture priority.

How to use the Camera to get the exposure you want

- Most (all?) cameras have the same 4 exposure modes:
    - **Fully Automatic (symbol varies according to make) or Program Mode (P)**
        - The “point and shoot” modes. Camera chooses **ISO**, **shutter speed** and **aperture** or on **(P)** the **ISO** can be fixed at 100, leaving camera to choose shutter speed and aperture.
    - **Shutter Priority Mode (S or Tv)**
        - Camera chooses aperture depending on **shutter speed** chosen by the **user**
    - **Aperture Priority Mode (A or Av)**
        - Camera chooses shutter speed depending on **aperture** chosen by the **user**
    - **Manual Mode (M)**
        - Camera chooses **nothing**

Some cameras have **Scene** and special modes as well. Except for “macro”, these should not be used for Church Recording.

- **Fully Automatic or Program Mode (P)**
    - Choose this mode if you are taking **pictures** rather than **photographs**. Good enough for basic Church Recording photographs in good light.

- **Shutter Priority Mode (S or Tv)**
    - Choose this mode if you are wanting to **control** the **blurring** or **freezing** of a **moving object** in the image. **Rarely appropriate for Church Recording**.
- **Aperture Priority Mode (A or Av)**
    - Choose this mode for static objects indoors (Fully Automatic or Program being an alternative if the natural light is good) and
    - Use it to control the **amount** of the subject that is **in focus.** It can **blur** the **background** to allow the main subject to stand out (low f number). It can **reveal** the **background** when the context is important (high f number). Particularly useful in poor light and when detail is important. A better photograph because of this control:
    - To pick up fine detail, especially in fabrics, use this mode on the lowest f number with spot metering (see below).
- **Manual Mode (M)**
    - Choose this mode when the camera's meter is not giving you the exposure you want in the other modes (*or use exposure compensation in the other modes*). High contrast situations, such as windows, are examples. Use an exposure meter, reading against the part of the view which needs to be right, to establish the settings.

A sample workflow

- The subject is a lamp fastened to the Chancel Arch.
    - You want the lamp to stand out, but the background wall to be seen, as well.
    - Therefore you will need an aperture with a medium depth of field, say f5.6 or f8.
    - The shutter speed is unimportant in this case because you will have the camera set on a tripod.
- First set the ISO
    - Use ISO 100 or 200 because that will give you the best quality, lowest noise image.
- Next set the camera on aperture priority
    - Choose the f5.6 aperture and make a shot.

- Use the screen on the camera and make sure the whole of the lamp and the wall (near to far) are in focus.
- If not, increase the aperture by a stop to f8 and try again.

- As you become more proficient with your camera these processes and decisions will become second nature.

In this case, the camera had interim aperture settings. The photograph was taken at ISO 100 at f7.1 and a 4 seconds shutter speed. It was spot metered (see below).

Because the light background would make the camera over expose, -0.7 **exposure compensation** (see below) was set.

Exposure meter and exposure compensation

Digital cameras have built in **exposure meters** (not to be confused with the focus metering). Check, if you can, the exposure metering on the camera. Possibly there will be a choice. The 3 main modes are:

- **Matrix** – sophisticated taking an intelligent average of the whole picture;
- **Centre weighted** – metering primarily on the main subject and, to a lesser extent, its surroundings; and
- **Spot** – metering on a spot on the subject.

For the lamp photograph, centre weighted might be best. For the West/East view above, matrix would be best.

Even so, a camera meter can be misled by **light** or **dark background** or variations within the subject.

A dark subject against a light background will probably be under exposed. A light subject on a dark background will probably be over exposed.

This calls for exposure compensation which:

- Allows the camera's metering system to be overridden by the photographer
- Is useful in Fully Automatic (P), Shutter Priority (S or Tv) or Aperture Priority (A or Av) modes
- Is useful in awkward lighting conditions
- Can be used to compensate for persistent metering errors

The lamp photograph required -0.7 exposure compensation because of the light back ground.

But this candlestick photograph, taken at ISO 100 at f4 (to blur the background) did not require exposure compensation, although it appears to be taken against a light background.

This was because it was taken in a dark, unlit corner at 5 seconds exposure on Aperture priority.

How to set on camera for **exposure compensation**:

- Look for this symbol 
- Use + values to overexpose (make lighter)
  Move the histogram to the right
- Use – values to under expose (make darker)
  - Move the histogram to the left
- Works in stops
- Applies to the shutter speed in Aperture Priority mode and to the aperture in Shutter Priority mode
- Remember to cancel it when finished

Other things which affect depth of field

- Subject distance from camera
    - Nearer = shallower DOF
    - Further = greater DOF
- Focal length of the lens
    - Wide angle (short focal length e.g. 28mm) = greater DOF
    - Telephoto (long focal length e.g. 300mm) = shorter DOF
- Size of sensor array of camera
    - Smaller sensor = greater DOF
    - Larger sensor = shallower DOF

Does and don'ts

Always use a tripod. Never use image stabilisation. Do not use digital zoom.