KAWARTHA CAMERA CLUB

Beginners Workshop

Rev. 2

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Welcome to our beginners workshop. If you have an adjustable camera there are three adjustments which determine the exposure. Together they make up the Exposure Triangle: Aperture, Shutter Speed and ISO. You should know where to access these on your camera. Today we will explore the effects of aperture and shutter speed and we will also touch on lSO.

THE EFFECTS OF HOW A PICTURE IMAGE IS RENDERED ON A CAMERA'S SENSOR WHEN CONTROLLED BY THE APERTURE AND SHUTTER SPEED

PICTURE

LIGHT

the right amount for a proper exposure

f/1.4 — f/22 — 1/2 sec. — 1/1000 sec

APERTURE — **SHUTTER SPEED**

more light — less light — more light — less light

LARGE APERTURE — SMALL APERTURE — SLOW SHUTTER — FAST SHUTTER

SHALLOW DOF — WIDE DOF — BLUR MOVEMENT — FREEZE ACTION

ISOLATE SUBJECT, BOKEH — MOST EVERYTHING IN FOCUS — CREATIVE — NO BLUR

APERTURE

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Every lens has an aperture. It is sometimes referred to as an f stop, f step or lens opening. If someone speaks of a lens being "wide open" they are referring to the lens set at its maximum aperture. (the illustration on the left) There is a moveable diaphragm* in the lens which adjusts the aperture.

(*I have used asterisks throughout this presentation to remind me where to give a little extra explanation.)

The diaphragm opens to let more light through, or closes to reduce the amount of light which passes through the lens to reach the sensor (or in the old days, the film).

You probably have never seen the diaphragm on your lens because the aperture in most digital lenses is wide open at rest. This is so there is the maximum amount of light for you to see the image in the viewfinder or LCD screen. But if you have never seen one it looks just like the images on the last page and I'll show it again on the next page.

When you press the shutter button the camera will instantly stop down the aperture to what the light meter has selected just before the shutter is opened then the diaphragm will open again after the shutter has closed.

The aperture is infinitely adjustable but there are what we call **full stops** and these are: f/1.4, f/2.0, f/4.0, f/5.6, f/8, f/11, f/16, f/22, f/32. *

They are called full stops because each full stop will either double or halve the amount of light which the diaphragm will let through the lens depending on whether you are going up the scale or down.

For example f/5.6 will let through exactly twice as much light as f/8, and f/22 will let through exactly half as much light as f/16.*

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You may wonder why there is less light with larger numbers and more light with smaller numbers. There is a mathematical explanation for this but we will not go into that now.

An easy way to try to understand it would be to make a fraction of the f stops, for example, think 1/8, for f/8 and 1/16 for f/16.

I don't recommend that you always refer to them as fractions but it may make more sense to you to think of them as such. With a little experience the numbers will become second nature.

Some lenses have a wide aperture such as f/2.8, f/1.8 or even f/1.4. These are sometimes called fast lenses and are almost always more expensive than slower lenses. These fast lenses usually have a large front element (expensive) which is required to capture the large amount of light which makes them fast.

The maximum aperture of a lens is referred to as the 'speed' of the lens.*

If we see a lens designation which reads: 35mm 1:1.8 we know that it is a prime lens which has a focal length of 35mm and a maximum aperture of f/1.8.* Pretty straight forward right?

Now another lens may have a designation of 55-200mm 1:4-5.6. Not so straight forward, but easy to understand once you know how to read it. 55-200mm means that it is a zoom lens (not a prime) and the maximum aperture is f/4 at 55mm and f/ 5.6 at 200mm.*

Generally, lenses are not their sharpest wide open or closed right down. The sweet spot usually is a couple of stops closed down from wide open. It would take a very experienced eye to notice the difference so don't hesitate to use the full range of apertures your lens offers.

THE EFFECTS OF APERTURE ON <u>EXPOSURE</u> (In simple terms)

When the aperture is opened up, more light is allowed to pass through the lens.

When the aperture is closed down, less light is allowed to pass through the lens (but there are other effects which aperture has on the picture).

DEPTH OF FIELD

Definition of Depth of Field - Depth of field (DOF) is the distance behind where you have focused to the distance beyond where you have focused where objects are acceptably sharp.

As a general rule, 2/3 of the DOF will extend beyond the point where you have focused and 1/3 behind where you have focused.

THE EFFECTS OF APERTURE ON DEPTH OF FIELD

When opened, the aperture decreases the depth of field and when closed it increases the depth of field. To say the same thing differently, a large lens opening will give shallower DOF and a small lens opening will give broader DOF. We will see this illustrated in the video at the end of this session.

Shallow DOF will make your subject stand out. Use a large lens opening so the subject will be in focus and everything else will be blurred.

If you want everything in your landscape scene to be sharp use a small lens opening to attain the maximum DOF.

There are two other things which affect depth of field:

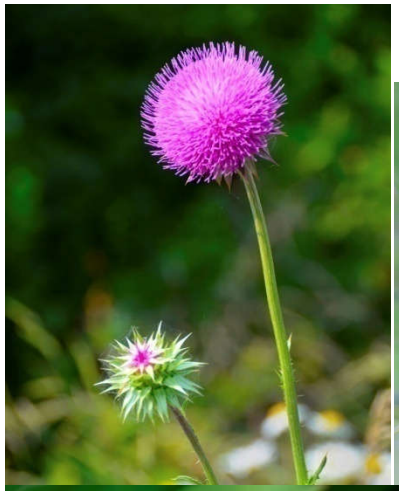
1. A telephoto lens will give shallower DOF;

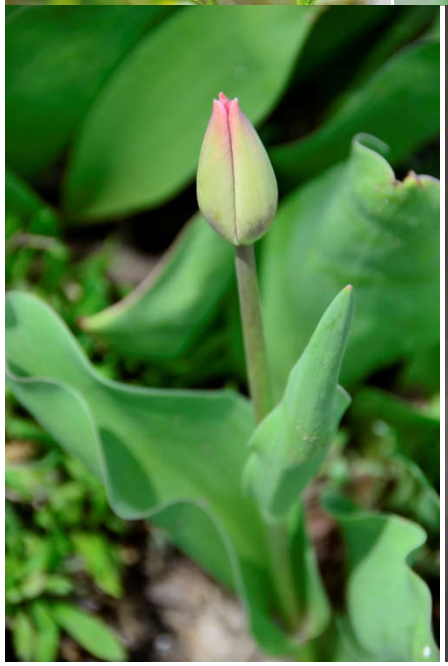
   a wide angle lens will give a very broad DOF.

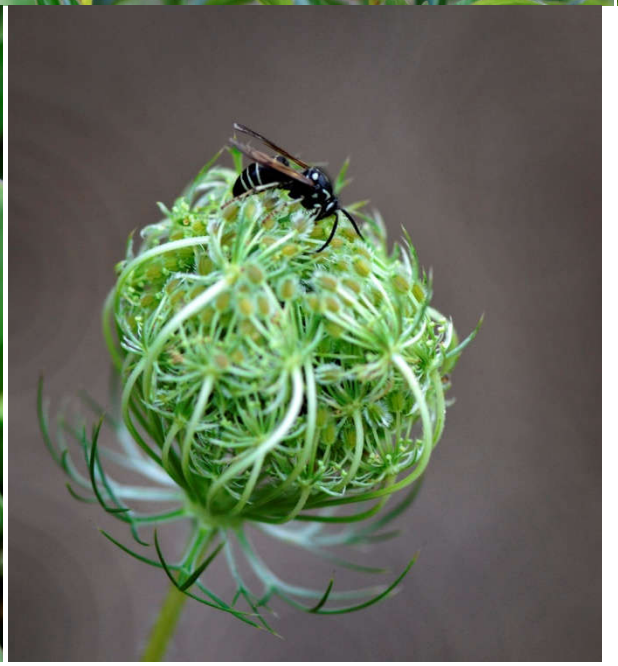
2. The closer you are to the subject, the shallower the DOF;

   the further away from the subject the broader the DOF.

The following pictures are examples of shallow DOF, bokeh and wide DOF. The picture of the tulip bud is shown as a poor example of DOF because the foreground and background are too distracting.







Now that we know everything there is to know about aperture we can discuss shutter speed.

SHUTTER SPEED

Like aperture which controls the amount of light reaching the sensor and has the secondary function of controlling depth of field,

shutter speed also controls the amount of light reaching the sensor and has a secondary function of freezing or blurring action.

Shutter speed controls the amount of light (that passes through the aperture and reaches the sensor) by the length of time the shutter is held open. 1/50 sec. lets in twice as much light as 1/100 sec. This also represents a *full stop.

The most significant caveat of shutter speed selection is blurred pictures due to a slow shutter speed and there are two types of blurred pictures. One is from camera shake and the other is from subject movement.

Camera shake should be avoided at all cost because everything in the picture will be blurred. Use a faster shutter speed or a tripod if you can't *handhold the camera without moving it.

Subject movement on the other hand can be good or bad. Bad subject movement is when the subject moves when you don't want it to and results in the picture being spoiled.

Good subject movement is usually dependant on the artistic talent of the photographer. Visualize a batter hitting a ball where the batter is not blurred but the end of the bat and the ball are blurred (because motion is faster at the end of the bat).*

This picture gives the feeling of motion where you expect it and is far more dramatic than a picture where everything is frozen sharp.

Or, a waterfall picture taken with a slow shutter speed will give the water a silky smooth appearance while everything around it which is not moving will be *sharp.

Panning a moving car at a slow shutter speed (if done right) will show the car sharp and the background blurred, giving the appearance of speed.

When panning, you must keep the subject in the same place in the viewfinder while the shutter is open. By doing so, the subject will not appear to be moving within the frame but the background will be blurred.

The next picture shows this effect*.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ISO

I said that we will just touch on ISO today so I will be brief. The ISO number is an indication of how sensitive your camera's sensor is to light.

It can be manually set or you can leave it in **Auto ISO** and the camera will bump it up when necessary. I will show you the two effects of ISO in the video demonstration at the end of the session.

Below is the link to the video that you can go to for practice.

http://www.canonoutsideofauto.ca/play

AUTO MODE

When you set your camera to Auto you have no control over lens opening, shutter speed or anything else. The camera will make **ALL** the decisions. None of the items you selected in the menu will take effect, it will even pop the flash up if it thinks there is not enough light which can be very annoying. (Your granddaughter's point & shoot camera or smart phone shoots in auto) The only thing you control is composition.

No photographer worth his or her salt would be caught dead with their camera set to Auto. If there is not a reason to use aperture or shutter priority use Programmed Mode (**P**). When you have your camera set to **P** the flash will not pop up unexpectedly and everything that you have set in the menu will be in effect. The camera will still decide what aperture and shutter speed to use and this is a good compromise.

MANUAL MODE

You no doubt have seen the letter M on the dial which you use to select aperture and shutter priority.* This setting allows you to set both the shutter speed and the aperture for a given picture. Hey, this may sound great but **YOU** will have to select the combination of aperture and shutter speed *to give the proper exposure. Not so great now eh? Suffice it to say that M will be left for another day (or year) but I will touch on it briefly in the video.

IN CONCLUSION

You, as the photographer must decide what you want your picture to show. For example:

- Do you want as much of the picture as possible to be in focus? (*Use aperture priority - a small lens opening gives broad DOF)*
- Do you want the subject to stand out and be isolated from the background? *(Use aperture priority - a large lens opening gives shallow DOF)*
- Do you want to cut down the light so that you can use a slow shutter speed and still have the picture properly exposed? *(Use aperture priority - a small lens opening reduces the amount of light passing through the lens)* **OR** *(Use shutter priority - select a slow shutter speed and let the camera select the small aperture)**

- Do you want to freeze action with no blur? *(Use shutter priority - a fast shutter speed does not give enough time for the subject to be blurred)*
- Do you want to take a picture with no subject or camera movement? *(Use shutter priority - a fast shutter speed will freeze - movement)*
- Do you want to take a picture showing some blur where there is motion? *(Use shutter priority - a*Medium shutter speed will only show blur in the fastest moving parts)*

If you want to control the shutter speed simply select **Shutter Priority** and the camera will select the aperture to give the proper exposure.

If you want to control the aperture simply select **Aperture Priority** and the camera will select the shutter speed to give proper exposure.

If you don't have a reason to use Aperture or Shutter priority leave the selector on P, never Auto.

So you see, you can put what you have learned today to use right away and not have to dread going out of Auto mode.

All you have to do is learn where to make the aperture and shutter speed adjustments on your camera* (read the manual) and you can put your newfound skill to use

But remember, if you don't practice what you have just learned it will be soon forgotten. Good luck, and happy shooting!

Diaphragm illustrations from www.digitalphotographylive.com