

METROPOLITAN SOCIETY OF NATURAL HISTORIANS

April 12, 2015 @ 12PM, Prospect Park

Host: Glenn Doherty

Hello, and welcome to the Photography Workshop! This roughly 1.5-hour event will discuss the very basic concepts and techniques of photography that will get you going with your equipment. Given that this is a group focused on "natural history," we'll dedicate this session more to outdoor scenarios. If you have questions later on about specific photographic concepts, please feel free to email me at doherty.glenn@gmail.com.

Before we get started, there are some things you should do and things you should bring. Please read carefully! These tips apply to this event and to every time you shoot pictures.

- 1) Camera Manual - It's best if you can read through this beforehand, so you know where the tools I'll speak about are located on your specific camera model. I won't have all the answers here! A quick internet search for the manual should be fruitful if you don't have a paper copy.
- 2) Camera - For this event, please bring a "point-and-shoot" digital camera with zoom capabilities and fully manual controls (manual controls not necessary, but this will be talked about in depth); or a DSLR (Digital Single Lens Reflex) camera with at least a zoom lens (18-55mm, 18-200mm, or 55-200mm are examples of good starting lenses)
- 3) Batteries for your camera - two batteries or sets of batteries are ideal. Make sure they are new batteries, or that they are fully charged, depending on the type.
- 4) Memory cards - Bring one, if not two, memory cards that will fit your camera model. Any capacity is fine, but I'd say ~2GB total is a good starting point. Make sure the memory cards are empty!
- 5) Lenses - Ensure your camera lenses are clean, or that you bring a soft cleaning cloth with you. Nothing like some smudges on the lens to ruin a great shot.
- 6) *Additional, but not necessary, equipment: tripod and flash*

Lesson 1: What should I shoot, and when?

Anything at any time! (OK, maybe there are a few exceptions... Use common sense, of course.) While a photograph is just a two-dimensional representation of a scene, it is also a means to communicate information about that scene or about the subject in that scene. It's important to isolate what part of that information you want others to see. Maybe there are many interesting aspects to the thing you're observing - but can you convey all that information with a single picture effectively? While there may be many interesting aspects to photograph, shoot them one at a time while you're starting out.

What do you want someone to see when they look at your photo? An action? A color? A size relationship?

Example: You're hiking and come across an interesting mushroom. *Why is this mushroom so interesting to me?*, you ask. Before photographing anything, take a moment and figure out what the "interesting" aspect of the *subject or scene* is that you want to share. Don't think the answer

will come right away! Sometimes you'll starting shooting and re-form your idea of what details you want to capture and share.

Here are two variations of the same scene. Study them for a minute. What do you gather from each image?



In the first image, the mushroom is the subject. To make sure that its interesting *subject* is clearly communicated, this image is zoomed way in on the mushroom so as to show off its unusual shape. In the second image, to the right, you'll see that the same mushroom is in this frame as well, but the image is zoomed out slightly - the intention here was to point out an interesting *scene*, that scene being the cluster of mushrooms and how they're all oriented in respect to one another.

Were these images successful? Well, that depends. Did the information or sense that you gathered from the images match the intent used in creating them? If so, you could say these were successful communications through imagery.

The nice thing about digital cameras is that you can take A LOT of pictures. **So the first thing to do in photography is experiment.** Shoot from different angles (climb a ladder, or lay on the ground). Shoot at different times of the day. Shoot with different framing (zoom in or out). Stop and turn around once in a while, as a great photograph may be just behind you.

Lesson 2: Composition

Before getting caught up in camera controls, spend time taking photographs in Full Auto Mode. How you place the object of interest in the camera frame, or from what angle you shoot a particular scene, has an effect on what exactly gets conveyed to the viewer. Here are some tips.

Hold the camera steady - When shooting a photograph, hold the camera level. Learn to make the horizons in your photographs look like horizontal planes. A photograph tilted to the side can make a viewer feel uneasy - and perhaps that's your intent, say, if a bird-of-prey was eyeing you from the trees and you wanted to capture that feeling of terror in a photo. But generally speaking, keep the camera level. You can still point the camera up or down, of course.

Brace the camera against your body - The easiest way to do this is to hold the camera in both hands and pull your elbows in so they touch your sides. Your body is a more stable platform for the camera than if your arms are extended out and away.

Rule of Thirds - It's easy to simply place the object you want to photograph in the middle of the frame and snap an image. To make an image more visually interesting, mentally divide the frame of the image into nine equally-sized areas. Some cameras have this feature available to you, and it overlays a grid on your image pre-capture (it won't be in the final image). The purpose of this grid is to have you place your subject(s) at one or more of the 4 vertices or along the grid lines.



By moving the subject - in this case, the sign post - to the side, you invite the viewer to "travel" down the trail with you. The arrow for the "Balconies Trail" points nicely to the person walking, which suggests a hike is in store for this day. Also notice that the important parts of the image are located near or along the grid lines - the two arrows are located near vertices, and the person is isolated to the right side of the image but closer to right most vertices than the image's edge.

Zooming - Zooming is a great way to isolate a subject (zooming in), or get a greater sense of an object's surroundings (zooming out). Don't forget that your object likely isn't located in a studio on a solid-color background - YOU have to figure out how to isolate it from distracting objects around it. Before zooming with your camera, try moving yourself closer to the subject! In the example below, it's a little easier to focus on the bird in the image when you zoom in and remove some of the distracting branches located in the scene. (In this instance, I used the camera zoom instead of walking closer, as I might have scared the bird off.)



Be aware of your surroundings - While it would be nice to think your subject will always be the focal point that everyone sees, that's not always the case. You probably have plenty of pictures of trees poking out over people's heads. Remember that your image is a two-dimensional capture of a three-dimensional world; all that detail will get squished into one plane - your image - and the viewer won't know where you want them to look.



Move the horizon up or down - For images where there is a clear horizon, experiment with placing it closer to the top or bottom of the image instead directly across the middle. Good places to locate the horizon line would be along the grid lines mentioned in the Rule of Thirds. It makes your image more interesting to look at.



Do note that these are not set-in-stone rules for "good" photography. Play around! Try displaying symmetry in an image (ignores the horizon and/or Rule of Thirds). Try zooming way out on a subject to put it in a greater context (that is, the subject's detail isn't important, but its relationship to its surroundings is).

Lesson 3: Basic Camera controls

Hopefully, you started your photography adventure having read the camera's operating manual. As with trying to figure out how to use a fire extinguisher in a smoke-filled room, it's always best to know how your camera operates by the time you need it to work for you!

In photography, there are three major camera settings that should be set for a photograph, and there are some minor settings as well. They are:

Major - aperture size ("f-stop"), shutter speed, and ISO (the sensitivity of the camera's sensor)

Minor - exposure bracketing, focus points, flash settings, etc.

Most digital cameras have a mode selector ring that gives you varying amounts of control over these settings, such as:

"A", or Full Automatic (usually a green rectangle) - the camera will control all of the settings above.

"M", or Full Manual - you will control all of the camera settings above.

"P", or Program Mode - the camera will control two of the three Major controls (usually aperture and shutter speed), but you retain manual control of other settings

"A" or "Av", Aperture Priority Mode - you control the aperture setting and the camera handles the shutter speed automatically.



"S" or "Tv", Shutter Priority Mode - you control the shutter speed setting and the camera handles the aperture size automatically.

There are usually some additional "automatic"-type modes available, such as:

Sports Mode - will freeze high-speed action

Portrait Mode - blurs the background so only the subject is in focus

Landscape Mode - the camera will try to get everything in focus

Macro Mode - the camera is reconfigured for close-up photography (usually really small objects)

As with taking photographs, experiment with the different settings to understand each one fully.

Lesson 4: The Three Major Camera Settings

Why are there so many, and especially manual, control options? When the camera operates in an automatic mode, it's making a lot of assumptions about how you want a photograph to look. Generally, that assumption is: "Everything should be in focus, the lighting should be flat (no contrast between the fore- and background, for instance), and the scene should be sharp all around."

But what if you don't like what your camera is capturing? Are you going to continue ordering off the pre-set menu at your local deli, or will you finally pipe up and ask for that cottage cheese-pastrami-alfalfa sprout sandwich on banana bread that you've always wanted to try? I think you get the point.

When photographing, think of the digital sensor as being a series of adjacent buckets that you must fill with water. The water is the light coming through your camera lens from your subject. In Automatic Mode, the camera determines how fast the buckets will fill with water. With

manual controls, YOU choose how fast those buckets get filled. There are reasons to fill them quickly and reasons to fill them slowly, which we'll cover here.

The Three Major Camera Settings involved in every photograph are:

Aperture – This setting refers to the physical size of a hole in your camera lens that you can adjust. Remember that a photograph is a 2D representation of a three-dimensional scene or object; using the aperture, you can control how much of that scene or object is in focus in your image. Shooting a landscape? You probably want a very small aperture so everything from near to far is in focus in your image. Trying to separate your subject from a busy background? You probably want a large, or wide-open aperture so just your subject is in focus.

When the aperture is wide open, the buckets fill more quickly. When the aperture is closed down, the buckets fill more slowly. Remember this for the next section of this article.

The aperture setting affects what's called the "Depth of Focus" (DoF) in your image. Remember that it's important to try and isolate the "important" aspect of your subject or scene. In the image below, I wanted to reveal the intricate detail of the item I had picked up. In this particular image, I used a large aperture (low f-stop number) to isolate the object from the distracting needle tree in the background. If I had used a small aperture (high f-stop number), the background detail of the tree would have been in focus, too, and blended with the detail in my object. How would you know what I want you to look at?



The "unit" of the aperture is the "f-stop." F-stops are a series of numbers that relate to the physical size of this opening in your camera lens. *We won't cover why f-stop numbers are non-linear in this lesson.* Here are the common f-stops and when they are best used.

Common Apertures (full stops) - called "f-stops"									
<<< more light; faster shutter speed; shallow DoF // less light; longer exposures; more DoF >>>									
1.0	1.4	2	2.8	4	5.6	8	11	16	22

Shutter Speed - How fast an image is captured is another major setting. A better way to understand shutter speed is to think of the question: "How long will the camera's shutter remain

open?" Are you photographing a redwood tree? You could probably use a "slower" (longer exposure) shutter speed - 1/30 sec, 1/60 sec - to capture it in sufficient sharpness. Is that redwood tree on a semi-truck barreling down the highway at 60MPH? If you want that redwood tree and truck to be in sharp focus as they zoom by you, you better use a faster (shorter exposure) shutter speed - say 1/250th of a second.

Shutter speed is important in determining how sharp the details in your image will be. With a fast shutter speed, everything will be sharp (assuming you're holding the camera steady); conversely, a slow shutter speed will blur objects.

If you're thinking about filling those water buckets: a long exposure time means the buckets have more time to fill up because the camera's shutter is open longer, but the result can be blurry images. Conversely, short shutter speeds mean you must fill the bucket quickly.

In the image below (left), the subject is attempting to jump and click his heels together. This event is over in the matter of one or two seconds, so you need to be sure the sensor's buckets will be full by then. You do this by decreasing the shutter speed (shorter exposure). Alternatively, in the photo to the right, a "long" exposure time (slow shutter speed) was used to blur the rushing water.; since the surrounding scenery is stationary, it could be kept in sufficiently sharp focus, despite the longer exposure time.



Sometimes you want longer exposure times - have you ever seen images of star trails taken at night in the desert? These setups use VERY long exposure times, and therefore VERY slow shutter speeds - on the order of hours rather than parts of a second. But here are some more common shutter speeds that you'll use in an everyday scenario.

Common Shutter Speeds (in seconds)											
<<< shorter speed; freeze action; less light // longer speed; blur movement; more light >>>											
1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1	2

With shutter speeds, there are some specific tips to note:

- The longest shutter speed you can use that will result in a sharp image when you are holding a camera in your hands is roughly 1/30th of a second. If your shutter speed is longer than that, use a tripod.
- If you're in a dark area and need to use a long exposure time, consider using a flash in your image, which should provide you ample light and therefore allow you to use a shorter exposure time/faster shutter speed.

ISO, or Camera Sensitivity - Less commonly talked about is what used to be called "film speed." Film speed pointed to the inherent sensitivity of the film itself - the higher a film speed, or ISO number, the faster the film could collect the light and fill its buckets. The same concept is true of digital sensors: set a higher ISO, and you can capture images more rapidly, especially under low-light conditions such as night-time shooting.

But that increase in sensitivity comes at a cost - the higher the ISO number, the more "noise" you will introduce into your photograph. Have you seen the "snow" effect on a TV channel before? That's "noise" in an image. Noise isn't pretty, and it makes images look grainy and bad. When possible, use a low ISO number. Sometimes, however, you are stuck with a higher ISO and you'll simply have to accept that the noise is going to be there. (You can sometimes edit noise out in post-capture software, but this has its limitations.) Think of images from the Hubble Space Telescope: the images you see on TV are heavily edited to remove noise that would distract you from what scientists truly want you to see - beautiful star formations. Sometimes noise in an image is an artistic choice (think of a bad horror movie in the woods), but it should really serve a purpose.

Typical ISO values are as follows:

Common ISO numbers						
<<< <i>low ISO; low noise; bright, sunny days // high ISO; high noise; low light scenes</i> >>>						
100	200	400	800	1600	3200	6400

Lesson 5: But what does it all mean?

If you operate a camera in Full Manual mode and adjust any of the Three Major Settings one-at-a-time between shots, you'll notice that you won't get consistent brightness in your images. Some images will have their detail blown out (over-exposed, or white), some will be too dark (too many black areas), etc. So how do you create properly-exposed images each and every time?

Shutter speed, Aperture and ISO are all intimately tied together - affecting one setting requires you to compensate by inversely adjusting another setting. Luckily, even though the scales for each setting are not linear, their relationship is. The best way to understand this relationship is to study the effects on shutter speed and aperture as noted through Aperture Priority Mode and Shutter Priority Mode.

Let's say you're using Shutter Priority Mode, where you set the exposure speed. You set the speed to 1/60th of a second, and the camera automatically controls the aperture and sets it to f-stop 8, or "f/8" for short. However, you want to shoot a little faster, at 1/125th second, or "one

shutter speed faster." The camera now has to compensate for the lesser amount of incoming light by opening the aperture "one f-stop," to f/5.6. By cutting the exposure time in half – the amount of time available to fill the buckets – you must open the aperture so that more light can get through in the shorter available time.

Or say you're using Aperture Priority Mode, and you set the camera to f/11; the camera sets the shutter speed to 1/125th of a second. However, you want less Depth of Focus in your image so you can really isolate your subject from the background. You open the aperture to f/4 - three stops' difference. You're letting in much more light, so the camera will compensate by shortening the shutter speed by three shutter speeds, to 1/1000th of a second.

Let's modify the previous example and say you started with 1/250th of a second at f/11. When you adjust the aperture to f/4, the camera tries to change the shutter speed to 1/2000th of a second - but the camera can't capture images at that speed, so any images you take will be overexposed. What can you do? In this case, you notice that your ISO setting is 400; by reducing this value by "one ISO setting" to 200, you make the camera sensor half as sensitive. Therefore, you must lengthen your exposure time by "1 shutter speed" (since you don't want to change the aperture) - to 1/1000th of a second, which your camera is capable of. You've resolved the issue.

Did you notice the pattern here? **If you increase the shutter speed (shorten the exposure), reduce the opening of your aperture, or reduce the sensitivity of the sensor, you must compensate for this change by increasing one of the other Major Settings by the same factor. Conversely, if you lengthen the exposure, open the aperture or increase sensor sensitivity, you must reduce one of the other settings by the same factor.** This is the only way to maintain a proper balance of settings for a well-exposed image.

That concludes the basic photography lesson. Below are some additional tricks you might incorporate into your photographs.

- 1) Humans – well, usually anyone who typically reads words left-to-right – are more likely to think of the left side of an image as a beginning and the right side as an end. If you were deciding where in your frame to place a dead or dying flower, you might place it along the two right-most vertices demonstrated in the Rule of Thirds. The sense of “the end” would likely come across more strongly.



- 2) Try returning to the same area at different times of the day. You'll notice different interesting scenes.
- 3) Instead of using horizontal or vertical “lines” to lead the viewer's eye around, try using diagonal “lines” of objects or naturally occurring lines in your image.

- 4) Most cameras come with a built-in flash module. While this is convenient, the light is usually very harsh and “flat.” If you use this built-in flash, consider diffusing it with an opaque cloth; this can be a tissue or a handkerchief (preferably white).
- 5) Light is great way to isolate a subject in a noisy background. Say there is an interesting duck floating in a pond, and that pond has varying amounts of shade. Shoot some initial pictures, but also wait to see if the duck moves into the more well-lit areas of the pond. Our eyes are more attracted to well-lit areas than dark ones.



- 6) External flash modules are useful accessories for expanding your photography portfolio. With the camera in one hand and the flash in the other, can you move the flash unit around while shooting images to notice the different effects of lighting on the image.
- 7) Practice “tracking” when photographing moving objects. Instead of holding the camera still and waiting for the object to go by, follow the object with the camera. With the right shutter speed, the subject will remain in sharp focus while the background detail gets blurred out. This adds a visual element of motion.
- 8) Try “cutting” subjects by placing them half-in and half-out of the frame. One way to utilize this technique is to portray a subject as entering or leaving the frame, conveying a sense of motion and also inviting the viewer to wonder what’s just outside the edge.

Additional online resources

More discussion of basic photo techniques and controls: www.learnbasicphotography.com

Forum for Beginners to interact and ask questions: Steve’s Digicams, “Newbie Help”

<http://forums.steves-digicams.com/newbie-help-16/>

Also be sure to check out Steve’s Digicams for good camera recommendations and reviews for all budgets and photographic needs.

Steve McCurry, a famous photographer, on some more composition techniques (with examples):

<https://www.facebook.com/video.php?v=799757146782515>

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Mode Dial image: Courtesy of Steve’s Digicams

http://www.steves-digicams.com/2004_reviews/d70/d70_mode_dial.jpg