Camera and Photoshop Tutorials August 10, 2007

Rules:

- You will be overwhelmed – it's OK – journey of 1,000 mile starts with first step – you WILL get this in time!!
- No question should go unanswered!!!
- Stop for EVERYTHING you do not understand!!!

Good resources are online tutorials

- General Digital Photography Tutorials
  - Cambridge In Color
  - StartPhoto
  - Camera
  - PhotoZone
- Photography
  - Basic
  - Advanced

Camera Basics

- Sensor
  - Size matters (lenses and quality of image) – both megapixels and cell sizes.
  - Full-frame vs. smaller
    - magnification factor, aka "crop" factor, more vignetting on full-frame at small f-stop, description, more special lenses required for wide angle
  - Different technologies – dynamic range
    - Fuji and here
  - Optics - more than you wanted to know!

Basic camera settings

- Jpg vs. raw
  - With jpg, the camera "processes" the image (color correction, saturation, contrast) and then saves the image - the processing has forever changed the original image (i.e., partially destroyed it).
- Image size & compression
  - Most cameras have 2-5 images sizes and sometimes levels of jpg compression that can be set
  - Simple rule: set max resolution and minimum compression - you always the best image you can get - memory and disk space are "free".
- Sharpness, contrast, saturation - adjustable in the camera
  - in general, disable all this and do in post-processing UNLESS you do not want to do post-processing.
- Profiles – different profiles for different settings (indoors, cloudy days, etc.)
- White balance
  - before and after the picture
    - USE a grey card!!!!
    - before the picture - you either tell the camera the type of light (outdoor, cloudy, florescent, etc.) or you set it to "Auto White Balance". See this.
    - After the picture - you adjust it in Photoshop or the equivalent
  - In general, cameras (I've used) do pretty well at AWB.

Mixed lighting – some light is one “color” while other is different. Good example is in a room with a lot of outside light coming in and you have it lighted with incandescents.

Photographic concepts

ISO, F-STOP (aka aperture setting), lighting, shutter speed (all four of these are related), Focus, Composition

Tutorials: here, here

Three things affect how long the shutter needs to be open:

ISO - "speed" the CCD cells respond to light

Aperture, F-Stop - how wide the lens is open - how much light makes it trough the lens and onto the CCD

How much light is available outside the lens - is it a sunny day or a dark room?

Tutorials: 1, 2

ISO

Effective speed of the film - how much light it takes to make an exposure

Numbers are always 1/2, 2x of each other. E.g., 50, 100, 200, 400, etc.

Digital cameras use the same calibrations as film

Lower numbers mean slower but better pictures

general rule is to use lowest ISO you can in a given situation (best quality image)

Go Up lowest setting when:

low light, want faster shutter speed, etc

F-Stop == how MUCH light

F-Stop vs. aperture - synonymous for all practical purposes

Origin of term vague - just think of it as a number that represent lens opening (albeit confusing and sort of backwards)

The "whole" numbers are: 1.0, 1.4, 2.0, 2.8, 4, 5.6, 8, 11, 16, 22

f-stop is a ratio of the lens diameter and the focal length - for this reason, you can see why it is hard to build a long focal length lens with a small f-stop:

f2 on a 50mm is 50/2

f2 on a 100mm is 100/2

The MOST confusing part for any new photographer: JUST remember in photographic term: a BIG aperture is actually referring to a smaller number engraved on the aperture ring of the lens i.e. f/1.4, f/2, f/2.8, f/4.0 etc. while small apertures means bigger numbers i.e. f/22, f/16, f/11, f/8 etc. Once you have "overcome" such "mental block" in calculation, it should help you greatly understand and enjoy more in other sections to follow.

A lens has metal blades that open and close based on f-stop setting

they set the amount of light that can enter the lens.

Each smaller f-stop lets in TWICE the light of larger and each larger lets in HALF the light of smaller.

The terms "open", "closed", "wide-open", "stopped-down"

Lower number means "faster" lens (more light coming in) - faster here means you can use a "faster" shutter speed (shorter time)
Lower number means shorter DOF!
Faster lens cost more for a given quality (because lenses have to be bigger to let more light in)
Faster lenses are heavier for a given quality
Image quality can be dependent on f-stop - some lenses are good wide-open vs. closed down. In general, most lenses look better when stopped down (because less of the "glass" has light coming through it - less distortion possible.
DOF (1/3-2/3 rule)
DOF Explanations
Good DOF Examples
Photozone - good table
1
2
Blurring all but subject makes subject standout
use small f-stops for people, large for landscapes
Up close, wide-angle vs. long-distance and telephoto of SAME composition - will the picture look the same?
Lens distortion
DOF issues at same f-stop
Hyperfocal distance
distance when lens is focused all objects appear reasonably sharp (subjective) from 1/2 HF distance to infinity.
DOF calculations - dofmaster.com and here
DOF increases with smaller lens and distance and larger f-stop
30mm lens at same distance as 50mm lens has greater DOF
50mm lens has greater DOF when focused on farther object
50mm @ f/11 has greater DOF than @f/8 at same distance
e.g. 50mm @ 4 feet, f/8: 3.60-4.51 (.9) f/11: 3.45-4.75 (1.3)
e.g. 50mm @ 8 feet, f/8: 6.51-10.4 (3.9) f/11: 6.04-11.8 (5.7)

Shutter Speed == How LONG light comes through lens
Explanation
Measures in seconds (or fractions of a second (e.g., 1/125))
Generally will be in doubling/halving fractions (e.g., 1/60, 1/125, 1/250, etc.)
rule of lens focal length vs. shutter speed (hand held), e.g., for a 200mm lens length, you need about 1/200 or faster shutter speed.
What speeds should you use?
what are you doing?
Movement - freeze - people, sports.

Movement - show - e.g., water
There are two types of movement - the objects in the frame and the camera!
No movement - hand-held vs. tripod

Sunny 16 rule - in bright sunlight: use f16 and shutter speed == ISO

Lighting

using available light

position subject to change light - move people into or out of shade
using an object such as a reflector to enhance light

Flash -

built-in
external

Attached
Detached - wired or remote

Curtains!! 1, high-speed-sync

Metering Light

camera light meters are designed to measure a certain color/quantity of light. Generally, this is the equivalent f 18% gray - the camera takes the area to be metered (depends on which metering mode you have set) and makes the resulting area be exposed to that level. If the subject you are taking a picture of happens to be 18% gray, than the camera will correctly expose. But if the subject happens to be much lighter than the average, it will come out over exposed and vice-versa. You may have to compensate the exposure to make the subject you are interested in come out properly exposed. 1

Metering modes - how the camera computes the exposure - how much of the scene it uses to calculate the proper exposure.

Exposure (not just getting too cold in the artic…)

The quantity of light allowed to act on a photographic material; a product of the intensity (controlled by the lens opening) and the duration (controlled by the shutter speed or enlarging time) of light striking the film or paper. The act of allowing light to reach the light-sensitive emulsion of the photographic material. Also refers to the amount (duration and intensity) of light which reaches the film.

Understanding the histogram

Taking the shot:

set ISO, aperture, shutter based on light (and what you want (under, proper, over exposed, motion blur, etc.))
Often, you want a certain shutter speed:

want something blurred (water in a waterfall)
want action frozen (sports or kids)
Control Shutter Speed:

Aperture
ISO
Filters (ND, color, circular polarizer)

- Amount of light (natural, flash, modifiers (reflectors).
- Often, you want to control DOF:
  - shallow to give subject a sense of 3-d depth
  - deep - want entire scene in focus from front to back
  - DOF can be changed by three things: 1
    - distance (changes composition)
    - Zoom (changes composition unless also change distance to hold comp)
    - Aperture - does not change comp but changes exposure (good or bad)
- Reciprocity: exposure = duration x time: inverse relationship between intensity and duration of light determines exposure.
  - a shot at 1/125 at f/8 would be 1/250 if aperture opened "one" stop to f5.6 (i.e., double the light)
  - Reciprocity failure: when the linear rules no longer apply - typically, when you get to either very long or short shutter speeds, the physics break down. E.g., if the shutter speeds get into seconds, it often takes longer for the exposure to be correct.
- Use f-stop and exposure 1/2, double rules. If you are 2-stops low, you can adjust either ISO, shutter OR f-stop OR ANY combination to get the 2-stops:
  - +1 ISO, -1 shutter
  - -1 Shutter, -1 f/stop
  - -2 shutter
  - etc.
- Maximum sharpness
  - Tripod
  - MLU
  - Manual Focus
    - harder now days because the lenses do not have the grids and "split" images they did in the "old" days.

- Shooting modes
  - Single shot
  - multiple exposure
  - Timers
  - Remotes - wireless, cabled
  - "tethered"
- White balance

Lenses

- Digital-only vs. full-frame - the multiplication/crop factor
- Focal length, 1, 2
  - Distance from center of lens to where the light rays converge or focus
  - Longer focal length means greater magnification
  - The "standard" 50mm lens on a 35mm camera - when you look through the viewfinder, it will look "normal" size - no magnification at all

- Focal lengths of point-and-shoots - I have seen then range from 5mm to 500mm!!
  - These are always in terms of the "standard" 50mm lens on a 35mm camera.
- Wide angle vs. telephoto
  - Wide angle means "short" focal length - e.g., what you see is a "wide" area compared with the 50mm "normal"
  - Telephoto means "long" which means small area, high magnification (like a "telescope").
- Fixed vs. zoom
- IS technology
  - in lens vs. in-camera
    - great if in-camera except for when you get rid of camera!
    - Great for in-lens when you get rid of camera but now you need all lenses to have the feature!
    - in-lens
      - heavier, bigger, more expensive
      - feature moves with lens, not camera
- Filters
  - The UV/skylight filter debate 1
    - some people claim you should have these on the front of every lens for protection of the lens yet most pros say don't bother.
    - some claim these block some forms of UV yet most digital sensors are not sensitive to UV
  - Neutral Density (ND) filters 1, 2
    - ND filters have four main uses:
      - To enable slow shutter speeds to be used, especially with fast films, to record movement in subjects such as waterfalls, clouds, cars, seas etc.
      - To decrease depth of field by allowing wider apertures to be used, which helps separate subjects from their background.
      - To decrease the effective ISO of high speed film (ie: above ISO400) and allow it to be used outdoors in bright situations.
      - To allow cameras (which have limited maximum shutter speeds) to film subjects such as snow, sand or other bright scenes which would normally cause over-exposure.
    - Split-ND: 1, 2
      - an ND filter on one part and a clear filter on another
      - Often used in landscape photography when sky is too bright relative to non-sky. Digital cameras have a limited dynamic range so it is tough to get both bright and dark subject in a single shot.
      - Option is to take multiple exposures and combine in post-processing.

- Only works well when there is a "clean" line between dark and light areas.
- Polarizing - circular: 1, 2
  - used to reduce reflection
  - to enhance the sky
- Colored
  - almost unneeded in digital because it is so easy to do in post-processing. 1
- Focus
  - Manual
  - Auto
    - Focus grids xyzzy
- Lens distortions
  - lens quality, type, size, etc.
    - fixed
    - zoom
    - telephoto
    - macro
    - fisheye
    - price proportional to size, quality, max aperture
    - contrast
    - clarity
    - glass vs. plastic lenses
    - choose your lens manufacture, then the camera follows
    - Vignetting
  - tilt lenses
- Coatings
  - Some are special to digital cameras because of light reflection off the sensor back onto the lens and back to the sensor glass that can cause ghosting of image
- Reciprocity - film vs. digital

Memory cards - sizes, costs, types

Batteries

- spares
- chargers - home, car
- ebay for non-OEM versions

Travel cases

- backpacks
- soft carrying
- hard cases
- What size - always bigger than all your current equipment!

Photography

- In the end, ALL photography is about "painting with light"
- Taking the picture - How do you decide on what camera settings to use to get the picture you want?
  - First (HARD!!), figure out what you want!
    - Learning to "see"

What makes a "correct" exposure (correct amount of light, not subject):

- Reciprocity: exposure = duration x time: inverse relationship betwen intensity and duration of light determines exposure.
  - a shot at 1/125 at f/8 would be 1/250 if a[eratire opened "one" stop (i.e., double the light)
- Use f-stop and exposure 1/2, double rules. If you are 2-stops low, you can adjust either ISO, shutter OR f-stop OR ANY combination to get the 2-stops:
  - +1 ISO, -1 shutter
  - -1 Shutter, -1 f/stop
  - -2 shutter
  - etc.

In auto-mode, camera decides for you.
Set ISO as low as possible (in general)
Set aperture for desire DOF if you care (let camera set shutter speed) - this is called aperture priority - you are giving priority to aperture and ignoring shutter speed
or set shutter speed for desired speed if you care and let camera set aperture - this is called shutter priority
Use manual mode to force camera to use your desired aperture and shutter speeds - rarely needed unless something about scene cannot be metered by your camera (e.g., external flashes, that camera does not know about).
use exposure override if you need it or camera is doing the wrong thing.
Exposure for digital cameras should always be less than pure white (245 vs. 255). Use histogram to see this or some cameras will "blink" overexposed areas.
Shutter curtains
Camera Settings

- See shooting modes (single shot)
- Meter readings

- Exposure settings, 1
  - Auto
  - Aperture
  - Shutter
  - Program
  - Other modes (portrait, night, etc)
  - white balance
  - exposure lock (sample use)
  - exposure compensation
- Focus
  - setting - grid
  - low-light issues
  - manual

- Flash
  - Flash exposure compensation
- Exercises
  - use each mode for same conditions
  - Use manual mode
  - Histogram
    - rule is to get exposure to almost touch right edge
    - how to adjust when it's not there:
      - exposure compensation
      - manual mode

Photographic Techniques

- Tutorials: here
- Lighting
  - Indoor
    - Flash
      - on camera
      - Always-on
      - Strobes
      - Equipment - stands
      - Gels
    - Light boxes
  - Outdoor
    - Sunny/Cloudy
    - Sunrise, sunset
    - Shade
    - flash fill
  - Light meters vs. on camera
    - With digital, you can look at the exposure
    - better camera give you a histogram
    - digital means you can easily "bracket" shots
    - Post processing gives some leeway in correcting exposure
    - exposure lock
- Composition
  - Rule of thirds, here
  - "S" rivers, etc
  - Lead eyes to subject
  - Distractions - color, strange compositions
  - Eyes see CONTRAST first, color next
- Tripods
  - styles/types
    - aluminum
    - carbon
    - steel
    - level legs
    - twist lock legs
  - Weight - cost inversely proportional to weight

- Cost
- Size
- Stability
- Tilt axes
- When to use
- Monopods
- ballheads
- leveling
- panoramas
    - rotating about the "lens pupil"
        - how to set up
- Studio/Home studio
    - Backgrounds
        - Fixed photography
        - People
        - Solid colors
        - Patterns, muslin, etc.
        - "chromakey" green and blue
        - Putting in BG in post processing
    - Umbrellas
    - Reflectors
- Color
    - white balance
    - gray cards
    - color cards
- Portraits
- Outdoors
- Night
- Multiple Exposures

You've got the shot, now what?

- Download to PC for post-processing
    - Using camera - NO!!
    - Using card reader
- Direct printing
- Printing at commercial printers - taking the media to them vs, PC, etc.
    - Online - costco, fotki
    - Carry-in
- Sharing services
    - many are free
    - can let relatives print their own!!
    - on-line slideshows, etc.

Printing Services

- Costco
- Fotki
- Dot photo
- MPIX

- Specilized services for B&W
- Color Matching profiles

Home

- Paper types, costs, speed
- Printers - types, manufacturers
- Inks – costs, clogging, from printer manufacturer vs. 3rd party
- New epson printers
- color profiling
    - monitor
    - printer
    - hardware
    - software
    - LCDs vs. CRTs

Print/ink life

- Wilhelm

Metamarism

Scanning

Collages

software

Slide shows

Software

music

Post-processing

- Why post-process?
    - simple operations like cropping are often only possible after the picture is taken (i.e., getting to the correct distance from the subject with a given lens may be impossible).
    - Removal of unwanted objects - esp. in the background.
    - The camera rarely accurately records what you "saw" or want to see.
    - Because of the camera and print limitations, an image must be manipulated to make it "feel" as if you were looking at the actual scene.
    - The camera image often needs improvement (such as sharpening or color correction)
    - A final picture is not always what is actually there in reality - it may tell a story that can only be told after editing.
    - Is it really "correct" to post-process - that's a personal decision. But, no image you ever see in a commercial setting is what the camera actually took.
    - Basic operations:
        - Adjust the geometry: crop, rotate, correct perspective distortion, etc.
        - Remove dust specks and scratches.
        - Correct for lens aberrations, if needed: distortion (barrel and pincushion), chromatic aberration (color fringing), and light falloff (in wide angle lenses).

Adjust the brightness, contrast, color tint, and color saturation of the image as a whole.
Adjust portions of the image to bring them into balance with the image as a whole. This typically involves the use of masks and may be facilitated by sophisticated techniques such as contrast masking.
Sharpen the image, and, if necessary, reduce grain.

Basic flow
- download / obtain pictures / images
- select desired images (using bridge)
- open / edit / save
- print (repeat for color issues, etc.)
- Palettes
- Zooming - shortcuts
- Toolbar

Bridge
- basics - setup
- viewing
- opening photos

File formats
- jpg
- raw
- tiff

General Flow:
- NEVER edit original!!!!
- Crop, rotate
- color correction
- editing, cleanup – remove unwanted, clone, etc
- sharpen
- save – which format?
  - always save PSD
  - for printing to service, save as sRGB

Basic editing
- Cropping, rotating
- Image sizes and pixels
- Levels
- Color
- Hue and saturation

Layers
- Concepts
- Adding
- Duplication
- Transparency
- Masks
- Layer styles
- Layer masks

- Other Tools
  - history brush
- Advanced selection techniques
  - extract
  - background eraser
  - pen tools
  - selection paths
  - magnetic lasso
  - select-color-range
- Paths
  - free hand
  - Bezier curves
- Channels
  - B&W control
- Color spaces
  - RGB
  - CMYK
  - LAB
- Compositions
- retouching
  - http://www.creativepro.com/story/howto/24434.html?cprose=daily
- Restorations
  - nilda samples
- Warping
  - 9xy sample
- Filters
  - Gallery
- color correction
  - here for lots of techniques
  - shoot with grey card
  - mixed lighting problems
- Other
  - Removing vignetting
  - Adding vignetting
- guides
- rulers
- History
- Text
  - Bits vs. vectors

Tablets

Color - monitors, printers

- Profiling
  - Printer
    - Paper
    - After-market inks
  - Scanner
  - Monitor

- Calibration
- Profiles (Adobe vs. sRGB)

printing

- image sizes and ppi

Tutorials

- great overall photoshop for photographers site here - lots of quick, simple solutions

Home studio

lighting

- hot
- strobes
- light colors

Things to demo:

- sensor cleaning
- basic color correction
- teeth whitening
- Eye coloring
- skin smoothing
- Eye enlargement, arms, legs, etc
- Vignetting

-END-