CRIME SCENE DOCUMENTATION

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PHOTOGRAPHY BASICS

1 **Introduction** to your camera and how it captures light (images):

A Remember: Cameras direct light (image) onto film or data bank. This light can be controlled by 3 different mechanisms

- Lens aperture (f/stops), e.g. f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16

  [Camera receives: increased light little light]
- Shutter speed, and e.g. 1/ . . . 1 2 4 8 15 30 60 125 250. . .

  [Camera receives: increased light little light]
- Speed of film (ISO/ASA) e.g. 64 100 200 400 800 1600

  [Camera receives: little light increased light]

double the ISO=half the shutter speed=one less f-stop setting

half the ISO= double shutter speed=one greater (stop down) f-stop

this is called the **Law of Reciprocity**

B Use these light controllers in different combinations for optimal performance (the best picture). **Good photographers know how to utilize these combinations**

C Digital cameras are becoming completely automatic. This does not make them fool proof, it just means they are more complicated to use appropriately. Be familiar with your camera—read your **manual**—have your **manual** with you—refer to your **manual.** Have I mentioned your **manual?**

2 **LENS APERTURE** (F/STOP) OR LENS OPENING: The lens aperture ring limits the amount of light allowed through the lens. This limiting is designated with f/stops—numerical representations of the aperture, where the number increases as the aperture (opening) decreases. [f/stops are a fraction; with distance to the film over the diameter of the lens opening. This is why the numbers are inversed, with larger the number, the smaller the opening (similar to shotgun gauges-12 gauge large, 20 gauge small) f/2= large opening f/11=small opening.

- **i.e.** **f/2 f/2.8 f/4 f/5.6 f/8 f/11**

- **Table 1** ***Aperture Reciprocity***

	Large Opening (Small No.)	**Small Opening (Large No.)**
Light	Requires Less Light	More Light
Depth of Field	Narrow	Wide

- **Notice**:

"faster" lens is one that has the capability of opening up and therefore lets in more light in (faster=quicker shutter speed). As you would expect, faster lenses cost more. So buying a lens with an f/stop that goes down to f/1.2, costs more than a lens that only goes down to f/4. (The expensive lens is more versatile because it allows more light to get to the film.)

So a great price on a lens that only goes to f/4, is not necessarily a bargain.

- 'faster lens' = lens with larger aperture
- 'stop down' = smaller aperture
- 'open up' = bigger aperture
- DEPTH **OF FIELD** sometimes referred to as "depth of sharpness" (Hattersley 1975):

  Controlled by two methods:

  1) Increase depth of field by reducing the lens aperture—stopping down—higher f/stop

  2) Move further from your subject, e.g. move to your infinity (∞) on your lens. From this point on, everything is in focus.

B Your lens (and manual) may indicate what's in focus according to your f/stop. Learn to look at those settings.

- **For the expert:** Place your subject at a long enough distance so that your lens indicates that the maximum depth of field extends to infinity. Therefore, your "sharpness" extends from your minimum range of depth of field (designated on your lens) to infinity; thus you achieve maximum dept of field.
- **Hyperfocal Distance**: half the distance setting to infinity
- **What about different length lenses**? Short/wide ~20mm More depth of field
  Long/tele ~100mm Less depth of field

3 **SHUTTER SPEED** (in fractions of seconds): "60" means 1/60th of a second of light is allowed to hit the film

A Notice: Professional travel photographers are acutely aware of the rule of thumb that you should handhold a camera at a shutter speed no slower than the reciprocal of a lens' focal length to avoid camera shake.

Speeds of 125 or faster stop most movement—but require more light

Speeds of 60 or slower do not stop movement—but require less light

Speeds of 30 or less need support, i.e. tripod, braced pose, etc.

Speed that stops monitors??

B Flash photography is shot at 60 (or 125), but the flash stops movement and prevents blurring

C Each exposure time is incremented like f/stops. '125' allows twice as much light in as '250'.

- typical speeds are B 2 1 2 4 8 15 30 60 125 250 500 1000

D 'B' indicates Bulb. This is the setting you use to keep the shutter open indefinitely.

4 FILM SPEED

A Notice: faster film takes less light—but you do loose accurate color and increased granularity as the ISO or speed of film increases. Documentation of a crime scene may allow for some of these disadvantages.

ISO=International Standards Organization replaced others in 1979

ASA=American Standards Association

DIN=Deutsche Industrie Norm

B Notice:

- ISO 100 takes twice as much light as ISO 200, and 200 twice as much as 400, etc.,
- So double or half the ISO is equivalent to using the next higher or lower shutter speed or f/stop: Thus the use of "different combinations."

C For the expert:

- If you have an old camera and the batteries die and you have no light meter, use the f/16 rule: when shooting in sunlight, your shutter speed approximates your ISO at f/16. With this in mind, you can approximate for many different lighting situations. Bracketing exposures would be essential in this situation.

5 **FOCUS**

A Focal length: Focusing a lens is simply adjusting the distance of the lens to the film. 50mm considered normal for 35mm film. 35mm is common for Digital non-SLR

B Focus is the most often abused aspect of photography. You bracket your exposures to compensate for exposure error, but **you can do nothing to compensate for poor focus**—so FOCUS ACCURATELY every time.

Remember: In crime scene photography, out of focus means essentially—NO DOCUMENTATION.
Out of focus scale—NO SCALE

Notice: If you have split image focusing, look specifically for something perpendicular to the split image to focus on. This is especially important for the automatic focus setting as well.

C Focus Distance: lens capability to focus

D **For the expert:** Scenario—you have someone beaten to death while lying on their kitchen floor. Blood spatter has impacted the underside of a utility cabinet. The cabinet is only 8 inches off the ground. How do you shoot the stains on the bottom of the cabinet without lying down in a decomposing pool of blood?

It is common to find blood stains in the most obscure areas. It can be a challenge to accurately photograph this evidence, especially when you cannot get into position to accurately shoot or you are not able to position yourself in front of the viewfinder. For those hard to get to areas, try what the professionals do, assess the distance between the camera lens and the evidence (measure if you have to), adjust the focus of you camera to that distance using the meter or feet scale on your lens, hold the camera in position and shoot. If you bracket, use a flash, and make sure the flash has a clear line of site to the evidence, it should turn out. Try it.

E **For the expert**: Do not forget to shoot close up. Distant shots are there to orient the most important shots—the CLOSE UP. For closest focus range, set your camera to the closest focus then slowly move in to the subject until it is in focus.

F **Also for the expert**: In the absence of a tape measure, the camera may be used to help determine distances.

6 Lenses

Wide angle: **advantage**: Brings more in to the field

close infinity, smaller focus length, greater depth of field

disadvantage: wide angle distortion

35mm common for digital non-SLR

macro=focus very close

zoom: 35-105 28-70 80-200

Telephoto: reduced DOF

25mm=90 degrees

50=45 degrees

100=22degrees

7 **EXPOSURE**

A You can see that with proper combinations of f/stops, shutter speed, and film speed, you have latitude to produce the type of photograph you want.

- Notice: No matter how experienced you are, important shots should be bracketed. You can bracket with any of the 3 mechanisms that control light. When using flash, older models of cameras bracket easily by changing f/stops, newer cameras may use a (+)/(-) button. I usually bracket 3 shots by shooting my best shot, then shooting 1 dark and 1 light. Bracketing is the best way to improve your chance of getting a good photograph. Do not forget to set your camera back to its original setting when bracketing.

B Do not let light, dark, or mixed light settings confuse the light meter (or you). Make your light meter adjust to the theme of your photograph. If you have an 18% grey card, expose it to the same light as the subject you want photographed.

Table 1. Listing of low and bright light photographic situations with possible solutions and consequences to these conditions

Photographic Condition	Possible Compensation	Problems/Advantages That May Occur
Low light	Slow shutter speed	-may blur, will not stop action
	Use tripod	-increases amount of equipment needed -but allows great depth of field
	Low f/stop (open up aperture)	-minimal depth of field
	Use high ISO film	-reduces color quality and increases grain
	If too dark use flash	-increases risk of error, stops action -reduces shadows -flattens image/reduces texture
Bright light	Fast shutter speed	-will stop action
	High f/stop (stop down aperture)	-increased depth of field (hard to decrease)
	Use low ISO film	-increases color accuracy and grain quality
	Bright mid day sun-use fill flash	-reduces shadows, increases risk of error

Table 2. Mandatory short list for reliable crime scene photographs.

Before you start:

- Camera manual Handy?
- Check your camera batteries—you are as dead as the deceased without fresh batteries
- Spare batteries—label these spares with the date purchased. Make sure all are charged, and hold a charge
- Easy access to batteries? Attach to camera, have second source of power in kit

Flash photography

- Power supply for the flash is charged and plugged into the camera body
- Test flash to confirm readiness
- Avoid reflective surfaces, you cannot shoot directly into window or mirrors or even a linoleum floor, just make sure you are at an angle to reflective surfaces.
- Use sync cord to get your flash away from your camera, avoiding flash back when shooting 90o angles
- Sync cord also allows you to bracket your exposure by varying the flash distance to your subject
- Be wary of shadows when shooting in open sunlight (high noon is the worst) Use fill flash if necessary or shoot mid morning or afternoon.

Be Wary of shadows-woods, dug out grave, etc.

Use fill flash if necessary or reflectors.

Bracket all important shots

Camera settings for flash photography:

Most older cameras use Manual Exposure (not automatic—you want to control shutter and f/stop).

Shutter on 60 (usually)

Flash and camera adjusted to proper film speed

Set F stop according to flash and ISO

All flash connections secure—hot shoe or cables

Check your flash. Make sure it is charging—do not shoot faster than the flash recharges

(Remember what you did right when you get good flash photographs at a scene)

Document other information with photographs

Shoot ID before every important scene change

e.g. Residence of John Deer, AKA Dear John

13 Postmortem Drive Temp: 85 f

5/1/10 15:35

Shoot all important documentation, i.e. crime scene map, photo record, thermostat, etc.

Remember

--keep camera out of the sun

--keep camera clean

--carry some sort of lens cleaning kit so it is handy and usable

--Keep lens cap on when not in use or at least have a skylight filter on the end of the lens for protection

--Velcro cap to camera if necessary, or put it in your pocket

--always check lens before shooting

--clean only with lens paper or lens brush

--do not use eye glasses cleansers

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8 CRIME SCENE PHOTOGRAPHY

A Introduction to crime scene photography: Why document a crime scene with photographs?

- Enables one to view something that no longer exists.
- Allows outside scientists to view evidence
- Can be used as a reference—even for details not considered at original time
- Refresh/confirm memory—shows what is or is not there
- Just another way to document

Basic approach to Crime Scene photography with an emphasis on blood stain photography

B Photos should always be an accurate representation of the crime scene

C Besides your main camera, have a small reliable back-up. Hand it to someone and take more photographs. This is the only way to ensure at least a medium quality photograph at the scene. You only have one chance at a crime scene. Digitals may also limit the need for personnel to enter scenes—gives command personnel enough information to formulate plan of action without entering scene (Lee 1994)

D Normal eye level is standard approach to photography—however, keep in mind the possible view points of the victim, suspect, or witnesses. Blood stains rarely occur at eye level.

E Do not forget to look in areas you would normally not look: i.e. ceilings, floor corners, behind, under or on top of objects, etc.

Do not forget to shoot close up. Distant shots are there to orient the most important shots—the CLOSE UP shows the evidence. Set your camera to the closest focus then slowly move in to subject till focused.

F Shoot a picture of crime scene's sketch—this can also introduce a sequence of shots

G Shoot a picture of the thermostat, clock, etc—it is all documentation

H Shoot your photographic log at the end of the roll—then there is no question of ID

I Basic premise: Memory is cheap—your time is not. Shoot it right the first time, there likely will be no second time.

J It may be good to download your photos in midstream just so you know nothing can happen to your camera memory. They make portable backups just for cameras.

K Cameras have incredible memory capabilities these days. But if you have that big of storage potential, you may not download often enough. Download after every case.

Bracket every important shot

Evidentiary approach: photographing bodies, always try:

L To go from general to specific

M Three shot sequence—overview, medium close up, close up (Lee 1994)

N From a distance, show setting—from at least two sides

O Half body shots—keep perpendicular to the body (this goes for evidence too)

P Hands, both sides: May substantiate transfer patterns

Q Feet—top and sides to see what is falling—bottom to see if walking in blood or if spatter occurred after the person was off their feet

R Mouth and nose areas—may indicate expiratory patterns and diluted (saliva) blood

S Wounds—they may explain the blood stain pattern found at the scene

T Try to calculate the victim's position at the time of trauma. Photo the relationship of the victim to his/her surroundings

Miscellaneous techniques and pitfalls

U Stay perpendicular to your subject—the final product is less confusing. Exceptions to this rule involve shooting at an angle to enhance a textured surface, or to avoid shiny surfaces.

V Use scales, then use more scales.

W Do not be afraid to experiment with different light sources

X Do not stage information. If something has been moved, be sure to note that or show that in your photograph.

Y Photograph any activity—even the living

Z Let your photographs tell the story. I shoot every case as if it is for a power point for class (or jury).

AA Do not let your work stifle your creativity—creativity makes you a better photographer, and a better document in the end.

BB Do not expect Photoshop to fix everything. Do it right the first time!!

Biohazards

Digital Imaging: Reasons to go with Digital (Stuckey 2004) **Digicams**

As good as film-5-6 megapixal resolution comparable to 35mm. Nothing to loose.

Quick Fix

Easy Panoramas: you can do 360◦

Travel light:

Memory

No film (x-ray not a problem)

Now have a 1 gigabyte card that holds 1000 1 megabyte photos=28/36 exposure rolls

Memory price has cut in half in a year—tiing is good

Online photo clubs

www.fotolog.net 1000s of new photos a day

Price of cameras has goon down

7 megapixal=used to be $250. now 12 megapixals=$300

Color/B&W: no longer a factor-don't need 2 cameras—some have a button to switch

Filters not a factor like they used to be

Small: now the size of a credit card Casio *Exilim*

Email: makes sending photos easy—keep to 75K for faster sending

3X optical zoom is common—new zooms are improving this

Fugifilm has the equivalence of a 12X, (35-420) zoom

Unlimited creativity: software is fairly cheap and unlimited Photoshop Elements ($100)

Photo developing: some drug stores allow you to make one trip and yhou have your photographs

Unload at home, pick them up later: www.lifepics.com

Publish a photo book: www.mypublisher.com

organization: easy to find, store and organize

Share on line: e.g. snapfish.com, ofoto.com, shutterfly.com let you store photos and allow others to view

No wasted prints: only 64% of photos shot are kept, only 29% are printed, so your prints are generally very good

Digital SLR for under $1000. Canon Rebel

Print you photos at a Kiosk: Kiosk where you can print your own photos from memory cards. digitalcameradeveloping.com, www.prints-are-memories.com

Polaroid effect: makes you a better photographer

Can get it right

Instant returns

No need to continue to shoot once you got it right

Print at home: Cheaper, get your own printer. Epson R300 $180—borderless prints directly from the media card

Film is expected to decline by 36% by 2006 (I suggest 80%). Costs will go up steadily.

Steve's: easy—point and shoot, people don't have to read the manual and some cameras are extremely versatile: Close up focus to millimeters, zooms, computer age

- Average age of digicam users=45
- 1 in 5 households have a digicam
- 26% have never owned a camera before
- 33% say making prints is not important
- 2002 average cost of a digicam was $328
- 2002 the average number of photos taken was 193

In an ideal world, the preliminary imaging should progress from outside the scene in question to each item of evidence gathered. Conversely, it should move backwards from gathered microscope evidence in the laboratory, to a very broad overall views of the scene that establishes interrelationships of evidence.

McEvoy 2002

Generally, all scenes of a particular type of crime have a sameness but each individual scene is different. A standard methodology can help create a standard methodology (that can be modified) for various types of scene imaging.

McEvoy Feb 2002

Is this image a fair (true and accurate) representation of the evidence in question? Points of Legal Challenge (Redsicker 1994)

CC Accuracy of color

DD Alterations of negatives/prints

EE Computer generated

FF Enlargements

GG 8X10 is considered standard

HH Errors in printing

II E.g. reversed print, backwards

JJ Equipment

KK Best to use available, or at least show both

LL Scale of reference

- usually said to shoot, then shoot with scale

K Lighting

L Relevancy and factual nature of the evidence

M Inflammatory photographs

N Marking/labeling

O Easy to show bias with labels

P Misleading

Q Optical Illusion

R Fish-eye lenses distort

S Be familiar enough to explain it

T Sight perspective

U Time frame

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