

Does Digital Photography Mean Forget the Basics?

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In a word, no! Having been involved in teaching digital image enhancement, I realize that many users assume digital is completely different to conventional photography and neglect the fundamentals. This article is intended as brief overview of some photographic basics as they apply to forensic lab and fingerprint documentation.

FILTERS

There is one basic rule: Colored filters tend to remove themselves and intensify their opposites when working with black and white images. For example: use a yellow filter to make a blue object appear darker (like the sky), also use it to remove background such as a ninhydrin print on brown cardboard. Why? Think of the cardboard brown as dirty yellow, the yellow filter will lighten the brown giving the ninhydrin purple more contrast.

Are polarizing filters are only good to remove glare? No, you can effectively use a polarizing filter to improve contrast. It is even better when you can use a technique called cross-polarization. This is when both the source light and the viewing lens are polarized.

DEPTH OF FIELD (FOCUS)

We learn early in our photography career that the smaller the lens opening the greater the depth of field. However, in talking close-up or macro photography the gain is minimal. For example: at f5.6 with a 55mm macro lens focused to 0.3 meters (12 inches) you only have a depth of field of 6mm (0.24 inch) if you stop down to f32 you greatly increase the exposure time but only gain a depth of field to 8mm (0.32 inch). The change is hardly worth it.

Focusing is a problem with modern cameras because they have done away with a split-image viewfinder or other focus aids to save money. It is wise to invest in a right angle finder or a magnifying finder. Quality optics are more critical with digital than with

film. If the lens optics are poor the image may appear sharp in the center but fuzzy towards the edges. Reducing the aperture will help but reducing the aperture too far will also reduce image clarity. It is important to find the optimum aperture for the lens in question, for high resolution results use brand name lenses such as Nikon, Canon or Zeiss.

ABSORPTION

Various objects absorb light unique to their color. A black car is black because it absorbs all colors, while a white car reflects all colors. In between these extremes are all the colors of the spectrum, and we can use this effectively to improve our photograph's contrast. By far the most successful technique is the use of violet light to photograph bloody fingerprints in a darkened area. The blood absorbs best at 415nm or violet light. This makes the blood appear darker (higher contrast) on a light colored surface. You can even capture blood images on dark back grounds by varying the angle of incidence, to find a point where either the blood mark or the back ground reflect more light. This technique is referred to as diffuse reflection or spectral illumination and simply requires patience. Since these techniques require no treatment of the sample, it has been perhaps one of the most successful uses of alternate light sources in my 20 years experience.

FLUORESCENCE PHOTOGRAPHY

The capture of faint fluorescent images requires a camera with a low noise level. In the digital world this equates to "snow" in the image or unwanted signals recorded on the chip from long exposures. This action is normally referred to as integration times in digital cameras. With a faint image you may need integration times of a minute or more. The beauty of digital is that you can immediately see the results knowing you have a perfect exposure without having to wait for the film to develop. Fluorescence photography requires a forensic light source with a narrow band pass. The new designs of high-powered LEDs can offer advantages here since they only generate a narrow waveband of light. Lesser light sources with broader bands may mask a weak fluorescent effect. The camera must also be equipped

with a suitable long pass filter or a second band pass filter in order to block the incident light from your light source yet still allow the fluorescent light from the subject pass into the lens and be captured. Many digital cameras with a high pixel count but a small CCD chip produce high noise fluorescent images which are unsuitable for fine detail forensic applications. Always test the equipment you plan to purchase to determine that it meets your needs.

CONCLUSION

In closing, remember that the best image is captured during the acquisition phase not by fixing it later on the computer. Good basic photographic skills are just that. Learn the basics – build success into your photography. ★

LARRY DOW is an Applications Engineer for Foster and Freeman. He has a BS in Biology and a Masters in Secondary Science Education. He was the President of ODV, Inc. manufacturing narcotic field identification kits and selling and lecturing on forensic light sources for 17 years. Larry has taught several thousand officers how to identify control substances using field kits. He has also taught light source use and theory since 1992. Thousands have benefited from his ability to present light source physics in an easy to understand format. Larry is recognized as an expert witness and an accomplished lecturer. He is currently teaching digital enhancement techniques using Image Pro-plus and Foster and Freeman's DCS-3 system.

The author has available two programs free of charge: one on Digital Imaging Techniques and the other on Fluorescent Theory and Application which are available free of charge by contacting Larry at larry.dow@fosterfreeman.com.

Student Photography Contest

The Student Development Committee of the Chesapeake Bay Division of the International Association for Identification will hold a Student Photography Contest during the Spring Education Conference in Morgantown, West Virginia April 18-19, 2008.

You may submit an original photo depicting the collection, documentation, or analysis of evidence. All photos must have been taken by the person submitting the photo.

All photographs will be displayed using push pins.

PROVIDE A BRIEF DESCRIPTION TO BE POSTED BELOW YOUR PHOTOGRAPH. This description should include the following information on a 6 x 4 piece of white paper:

- Digital or film,
- Type of camera and lens used,
- Whether or not the image was enhanced and what method was used, and
- A brief description of the photo.

THE PHOTOGRAPHS MUST:

- Be 8 x 10 unmounted,
- Color or black and white,
- Have no identifying marks, such as name, school, etc.

Photographs to be judged can be delivered to Lori Britton in the vendor area beginning Friday, April 18 at 12:00 p.m. Each entrant will be assigned a number to be used during judging and return of your photograph.

Please email the following information to Lori.Britton@mail.wvu.edu using CBD Photo Contest in the subject line:

Name, university, contact address, telephone number, email address, and description of photo to be submitted.

Deadline for entries is Monday, April 7, 2008. Prizes will be awarded.

