

Booklet #15: The Northern Virginia Alliance of Camera Clubs

THE ART OF INFRARED PHOTOGRAPHY

Using Film and Digital Capture

by

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PREFACE

The Northern Virginia Alliance of Camera Clubs (NVACC) is an informal organization started in 1997 by Joseph Miller with the assistance of Dave Carter and Ed Funk. Our purpose is to promote communication and cooperation among camera clubs. We accomplish this by (a) publishing a monthly calendar of the member clubs' activities; (b) conducting training seminars for photographic judges; (c) maintaining a registry of trained judges who serve the clubs' monthly competitions and critiques; and (d) maintaining a directory of speakers who have been recommended by the various clubs. You can learn more about NVACC by going to our web site at www.NVACC.org.

This booklet is one of a series that was developed by NVACC during the period 1998-2008 to capture the considerable expertise of the many accomplished photographers in Northern Virginia and share it with others. Over recent years, we have seen significant change in the photographic art form and very rapid technical advance in both the media of photography (film and digital) and the tools (cameras, lenses, computers, and software). For that reason, the detail of some of these booklets may seem "dated", although the ideas and techniques presented transcend "progress" and the digital-film divide. Watch the NVACC web for new booklets as well as revisions that incorporate new technology and ideas into the existing ones.

Originally, our booklets were made available through member clubs for a small fee that covered the cost of reproduction. Now, however, the booklets are available on www.NVACC.com where individuals may download one machine-readable copy and one print copy per page for personal, noncommercial use only. Written permission from NVACC is required for any other use.

If you would like to know more about NVACC or have questions or suggestions concerning our booklets or services, please feel free to contact us at JoeMiller@NVACC.org.



The Art of Infrared Photography

Using Film & Digital Capture

Introduction

Black and white infrared photography is a fascinating creative undertaking, but one that many shy away from because of the myths that surround handling and exposure of this special film. I hope the information provided here will inspire you to make an excursion into the magical invisible realm of black and white infrared photography.

Before I discuss infrared photography, let me say a few words about black and white photography in general. Think back to when you first became interested in photography. Chances are that one of your earliest photography courses placed a lot of emphasis on black and white. What's so fascinating about a photograph that's been denied the benefits of the color spectrum? Why do so many photographers return to explore the nuances of black and white?

Most people who truly enjoy photography find that experimenting with black and white helps make them better photographers. In some types of scenes, color can actually get in the way of creative expression by calling attention away from the underlying forms, shapes, and contrasts that black and white reveals. A black and white image can carry viewers into the realm of abstraction. It is superb at capturing lines, textures, shadows and patterns and translating the complex play of light into simple tones of black, white, and gray while eliminating what can sometimes be the confusing and overpowering factor of color.

It can be difficult to visualize in black and white because everything around us is in color. In order to help you "see" in black and white, the first step is to go out and shoot a roll of black and white film taking along a notebook to record the important statistics: time of day, lighting, and weather conditions. Once you've got your black and white prints, go back to the original scene at the same time of day, with the same lighting as before, and compare the print to the scene. You will notice that if two different colors in your scene are similar in brightness, they will turn out the same shade of gray that will not be too compelling. The most effective black and white pictures, I feel, have at least one area in the photo of strong contrast between light and dark, preferably next to each other. Examples are a yellow flower against the dark bark of a tree or white foamy waterfalls against dark rocks. This is the area that will draw a person's eye into your photo. As you gain experience in seeing in black and white, you will want to include a full range of tones in the scene, but starting out with a good black and white tone in the photo is a positive beginning. Remember, too, that shadows form part of the composition especially in black and white photography.

Black and White Infrared Films

Light, the slice of the electromagnetic spectrum visible to us, covers a range of about 400 nanometers to 700 nanometers. Infrared films are sensitive to the entire visible spectrum, plus beyond visible light into the near infrared region. There are only a few films sensitive to this region with the ability to record wavelengths that the human eye cannot see. Eastman Kodak, Konica and Maco manufacture black and white infrared films capable of doing this. The Konica and Maco films, reaching 750 to 820 nanometers respectively, do not exhibit as many characteristics of infrared as the Kodak film that reaches beyond 900 nanometers. The Kodak (HIE) 35mm film, which will turn an ordinary scene into something extraordinary, is the film I will be discussing.

Unexposed HIE (high speed film) must be stored in the refrigerator. Allow 2 hours for the film to come to room temperature before loading it into your camera or you may have condensation marks on your film. If using an automatic camera, set the ISO first or your camera may flash error. The film does not come with a preset ISO, so later in the notes; I will give my recommendations for setting this ISO. Because the felt cassette light trap is not infrared proof, the camera must be loaded and unloaded in total darkness. I find a changing bag to be indispensable. The black bag becomes a portable darkroom. I can readily load a new roll into my camera at any time I'm out shooting. After exposing your roll, load it back into the original canister, the only container guaranteed to be light tight. If you are not going to process it within a week, it's best to return it to the refrigerator. In modern airports, you should have no qualm about letting your infrared films go through the x-ray machines. A bigger threat is the security guard that insists on opening up your canisters to check their contents. This will certainly fog and ruin your film.

Processing the Film

The chemicals you use to process infrared film do make a difference. A local lab I work with did test stripes with 5 chemicals, T-Max, Ilfotec, Rodinal, HC 110 dilution B and D-76. The chemical producing the sharpest images, the best tonal range and contrast was the D-76 undiluted for a time of 8 minutes at 70 degrees. The second best chemical was HC 110 dilution B for 5 minutes. Do not use an acidic stop bath as it will pit the film.

Please note that the following sections dealing with characteristics, focusing, and subject selection apply to digital capture just as they would if you were using film.

Characteristics

- It's contrasty.
- It has more grain structure than regular black and white films.
- Healthy foliage appears white when hit by the sun. The exceptions are foliage in

deep shadow that will appear dark. Evergreen trees even hit by full sun will appear light to medium gray.

- If the sky is blue, it will go dark and white clouds, if present, will pop out.
- Bright objects lit by intense sun will glow. It will uncover things that the human eye cannot see.
- Indoor pictures lit by tungsten light will photograph with infrared qualities because tungsten light emits infrared, but mercury vapor lamps, fluorescent lights and sodium vapor lamps don't record any different than on a regular black and white film,
- Night scenes photograph as in regular black and white film except for an added glow from neon signs, street lamps, etc.
- Colors can help you predict how an object will record on the film: (a) reds, whites and greens in sunlight appear light in tone; and (b) blues, browns, and dark greens in shadow will appear dark.

A regular black and white film like Kodak's Plus-X has 9-stop exposure latitude. Kodak's Infrared has a 3-stop latitude. The beauty of infrared is that the midday light that renders a scene flat and lifeless with regular black and white films and slide film is the best time to shoot infrared. Under harsh midday sun, infrared radiation is at its highest so the film will uncover unexpected gradations of tonality that are not apparent to our eyes or other films. However, as long as the sun is present, any time of day from sunrise to sunset is appropriate to shoot infrared.

Focusing with Infrared

Because you are shooting with a film that records infrared wavelengths, it will be on a different focal plane than visible light. Some lens barrels will have red infrared index marks to compensate for this situation. However, I do not use these index marks. My experience has been that by using a wide-angle lens with at least an f-stop of 11 or greater it gives me the necessary depth of field and sharp focus. To obtain infrared effects a filter must be used in front of the lens. I use the red #25 filter. If you use the 87 and 89 opaque filters the refocusing for the infrared is more important because you are focusing on strictly infrared wavelengths. By using the red filter you focus on some visible light which makes it easier to get sharp photos with no adjustments.

Selecting Subjects for Infrared

With the uniqueness of the film, I prefer shooting scenes that show off its special qualities to greatest advantage. Therefore, I like to shoot landscapes with wide angle

lenses because I want to capture the most elements that emit infrared such as the deciduous trees, grass that glows like ivory, and blue skies that will turn to ebony. I often like to include an architectural element, particularly old barns, period houses and things that suggest a bygone era. Landscapes such as you would find in the West with mostly evergreen trees and rocks aren't as successful because these do not emit much infrared radiation. Thus the same sense of the ethereal does not come across.

There are some things to consider when photographing people. Infrared evens skin tone lightens freckles and red marks and softens lines and wrinkles. However, veins close to the surface will show as dark lines and razor stubble is apt to show through the skin. Brown eyes in direct light can expose transparent. For fair skinned people with light eyebrows and eyelashes they will all but disappear. In general the most successful use of the film is for nude photography where the advantages of making the skin look flawless and porcelain are desirable.

Choosing the Right Equipment

Most any 35mm camera is useable for infrared film. I use older Canon equipment. I am often asked if the newer Canon cameras that have an infrared sensor (which include the A2, A2E, the Rebel and Elans) can be used successfully. I have read, and my own experience is, that these later models may fog the sprocket area of the film, but to my knowledge have never fogged the picture space. You must use a filter to register the infrared

effect. The most useful filter for the best results is the #25A red filter. This gives you infrared filtration with an acceptable exposure loss of 2 stops and allows the photographer to see through the lens. The 80 series opaque filters will increase the infrared effect, but 3 stops of light are lost; they are extremely opaque so you will have difficulty seeing through the filter to focus. In this situation you will have to focus before the filter is put on the lens. Also, shutter speeds are so slow the filter is useless for photographing anything moving. I look at these opaque filters as a last resort when you have a hazy dull day and want to try to bring out some infrared in the scene.

A wide-angle lens is very effective for its increased depth of field. It also includes more of the scene like the sky and other objects that will glow with infrared. A tripod is very important, not only for the usual benefits to composition, but also because using the red filter and the small f-stops required to obtain proper focusing will cause the shutter speed to be slow enough to require the use of your tripod. Additionally, I would recommend a lens hood, as infrared film is more prone to lens flare than standard films.

Setting the Exposure

I use my matrix meter (T.T.L.) in the camera to determine exposure. There is no ISO

coded into the film. Therefore, you must set the ISO yourself. After shooting over 200 rolls of infrared, I have found that setting your ISO for 320 is an excellent starting point. With a #25A red filter on my lens, the ISO set at 320, I then bracket one stop over at ISO 160 and one stop under at ISO 640 (the ISO would differ with other red filters of deeper densities). You will be metering right through the camera with no hand held meters required. If you own a camera with an automatic exposure compensation dial, it makes bracketing very simple. The result, after processing, the film will be a contact sheet with 12 scenes of 3 exposures each.

Bracketing is not a waste of film because there is no accurate way that a meter can measure the wavelengths this film is capable of seeing. Therefore, even with experience, bracketing is necessary to obtain at least one usable and printable image. More often than not, you have three printable and different interpretations of the same scene that can be used for creative effects. The 160 ISO bracket will yield the most infrared looking image, like a snowstorm in the Rockies. The contrast and sharpness will be the lowest and the grain the highest. This particular image will most readily lend itself to hand coloring and dreamy surreal effects. The 320 ISO is the one I print most often because lots of infrared effects show, and it exhibits increased sharpness and contrast. The 640 ISO version starts to look more like a standard black and white print with higher contrast and sharpness and the least grain. So you can enjoy one scene in 3 different ways.

I want to stress that an ISO of 320 is a starting point for your equipment. Run a roll of film through your camera and examine the results. If your pictures are underexposing, decrease the ISO. If they are overexposing, increase the ISO. You will readily see what you need to do with the next roll.

Infrared negatives properly exposed are no harder to print than any other black and white negative. I like Ilford multi-grade fiber base paper for my prints. For developing the print I use Ilford developer and fix and Kodak indicator stop bath. I do take the film to be processed to a local lab that specializes in black and white.

Digital Infrared

It is not difficult, in fact in some ways it's easier, to achieve the classic infrared look with digital cameras. All the characteristics of infrared I mention that occur with film will also happen with infrared with the exception of the grain. Digital infrared does not have the grainy look, but can be added later with Photoshop. You may even prefer not having the grain at all.

Many digital cameras are capable of recording infrared, but some do have an infrared blocking filter. To determine if your camera reads infrared, there is a simple test. Since your TV remote operates by using an infrared beam, with the compact digital camera you point a TV remote at your lens. If it shows a flickering light in your LCD screen you

will know you can use this camera for infrared. With the SLR, you again point the remote at the lens. Since you can't see the image immediately in the LCD screen you will have to take a picture and review the image, looking for the bright spot showing the camera reads infrared.

Unlike a film camera, you must filter out all visible light. Therefore an extremely opaque filter must be used. The 72, 87, and 89 filters seem to work with most cameras. The Hoya 72 filter is not as expensive as most of the opaque filters. Advantages of digital infrared are you don't have to use a changing bag. You can check the histogram for exposure immediately and then make any adjustments necessary. You also see the image in your LCD screen. This is a big plus to be able to review your images for good exposure and composition immediately. However, since the filters are very opaque, you will have to compose the image first without the filter on. You will encounter long exposures and may have to either bracket sometimes 2-3 stops over or increase the ISO to get an image to even register. A tripod is absolutely essential. Moving objects and windy days are not good components with digital infrared because of the long exposures you will encounter.

After you have a worthwhile image, you can work with any changes that need to be made in Photoshop or other software program you are comfortable with. If you are using an SLR you must convert the image to grayscale. Go into Image_Mode_Grayscale. I usually use levels in expand the dynamic range of the image. I have the Epson 1270 and, through trial and error, have found that using Epson's Matte Heavyweight Paper and printing in black, not colored ink, gives me the most neutral attractive black and white photo.

Once you cross the line into this magical invisible world, you may never go back. For further information please contact me at CPSteckley@aol.com.

For additional reading:

Infrared Photography Handbook by Laurie White

Advanced Infrared Photography Handbook by Laurie White Hay ball.

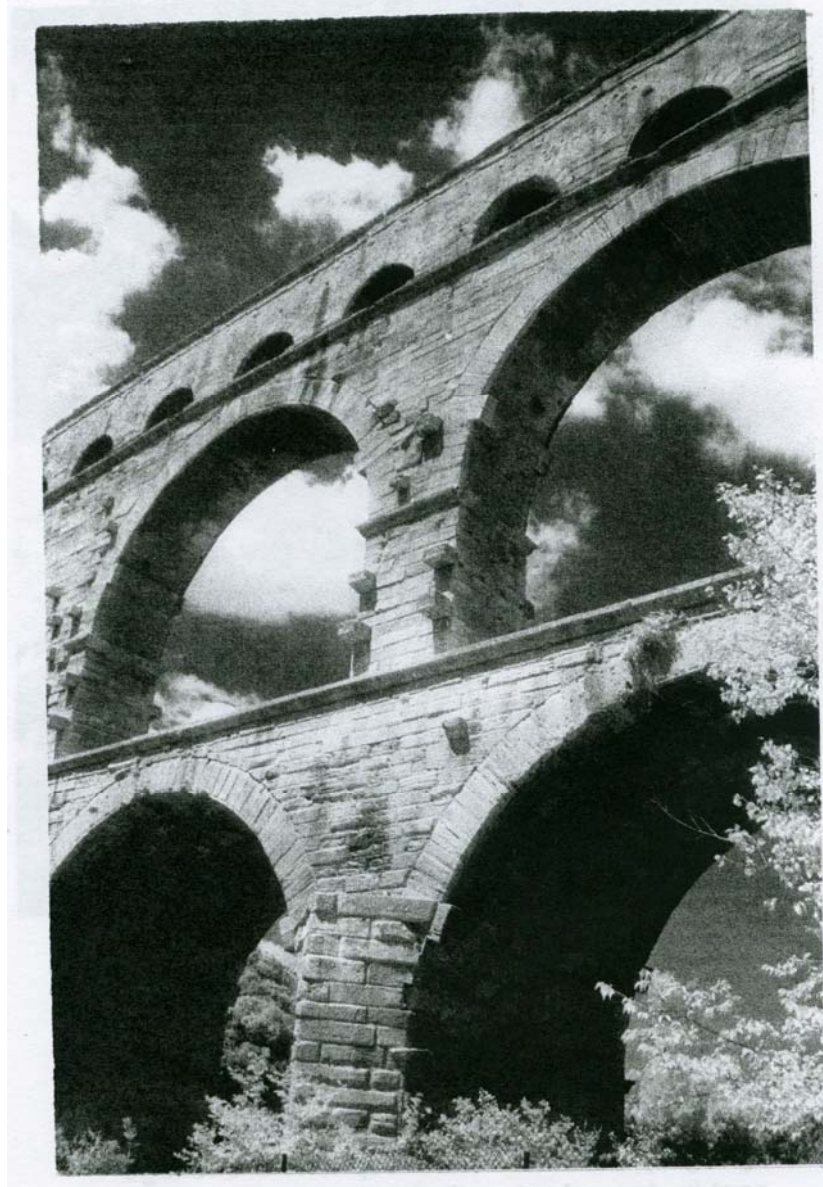
The Art of Infrared Photography by Paduano

Infra-Red Photography by Hugh Milson



Gazebo

Unlike standard black and white film here Green records as medium gray, with infrared film healthy foliage and grass will appear very light gray to white. The exceptions are foliage cast in deep shadow that will appear as a dark tone and evergreens hit by full sun will be a medium gray. As in the front of this gazebo, objects hit by intense sun will frequently glow.



Pont du Gard

With infrared film, on a blue sky day skies go black and clouds will pop.



Quiet Waters Park

This landscape exhibiting classical infrared characteristics has the gazebo placed off center for compositional interest.



Serenity

Infrared film gives a dreamy, surreal look to the landscape.



Rural Virginia

A very powerful element in infrared or any black and white image is to have a dark tone and a light tone appear next to each other. Notice the light grass next to the darker rustic building and the dark fence surrounding the light toned foliage. These contrasting tones draw the viewer into the photograph.



Golden Gate

The Golden Gate Bridge was photographed on the same day and time with slide film, and Kodak's HIE high speed infrared film. By far, the mood of the fog rolling in was most effectively portrayed with the infrared film.



Barn in the Blue Ridge

Certain subjects are particularly well suited to infrared film. Rustic barns are among those where film and the subject are well matched.



Galveston Gothic

Infrared film is a classic choice for any architectural photograph where you want to pay attention to the effects of light on a building's basic shape, structure, line or form. Shadows are especially important in black & white photography. Note how the shadows add an interesting compositional element to this photograph.



Assateague Lighthouse

The film has the ability to uncover things the human eye cannot see. The wispy clouds behind this lighthouse were not visible to the naked eye.